CONTRIBUTIONS TO THE KNOWLEDGE OF *MORAEA* (IRIDACEAE) IN THE SUMMER RAINFALL REGION OF SOUTH AFRICA[1]

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ABSTRACT

This paper comprises a preliminary revision of *Moraea* in the summer rainfall area of South Africa. A brief review of taxonomic history and a summary of morphological characters of the genus is followed by the taxonomic treatment. *Moraea* is divided into five groups or series not equivalent to formal taxonomic ranks. Twenty-seven species and eight subspecies are recognised. Eleven new species and eight subspecies are described.

The genus *Moraea*, a geophytic, herbaceous perennial, is scattered throughout sub-Saharan Africa. Like most genera of the family in Africa, it occurs mainly in mountain regions, except in the south, where it achieves maximum development and is found in all situations. Although the majority of species occurs in the winter rainfall region of the Cape Province and the widest range of forms is found here, the genus is very well represented in the summer rainfall area, a fact not generally known because of our poor knowledge of the genus in this region.

The need for a workable and natural taxonomy of the genus in the summer rainfall region is twofold, for not only is there no general treatment at present, but also, because certain species are highly poisonous to sheep and cattle, there is a more immediate reason for a revision. As soon as a correct taxonomy for the group can be produced, it will be easier to study the species from this important practical aspect, as pointed out by N. E. Brown (1929).

Because of limitations in time, and the inadequacies of our knowledge of the genus in many parts of South Africa, the present paper has many deficiencies, and no claim is made for this this work to be a definitive study. It is quite clear that many aspects of the genus, particularly the *Moraea spathulata* complex, require further study in the field. It is hoped rather that this work will provide a basis for further investigation and will serve to indicate those aspects least understood.

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[1] I am grateful to those in charge of the herbaria at the following institutions for making available their material for study: Albany Museum, Grahamstown; Bolus Herbarium, Cape Town; Natal Herbarium, Durban; Botany Department, Rhodes University, Grahamstown; Botanisches Museum, Berlin-Dahlem; British Museum (Natural History), London; Cathedral Peak Forest Station; Compton Herbarium, Cape Town; Government Herbarium, Stellenbosch; Royal Botanic Gardens, Kew; Muséum National d'Histoire Naturelle, Laboratoire de Phanerogamie, Paris; National Herbarium, Pretoria; Naturhistoriska Riksmuseet, Stockholm; the herbarium at the University of Lesotho, Swaziland and Botswana at Roma.

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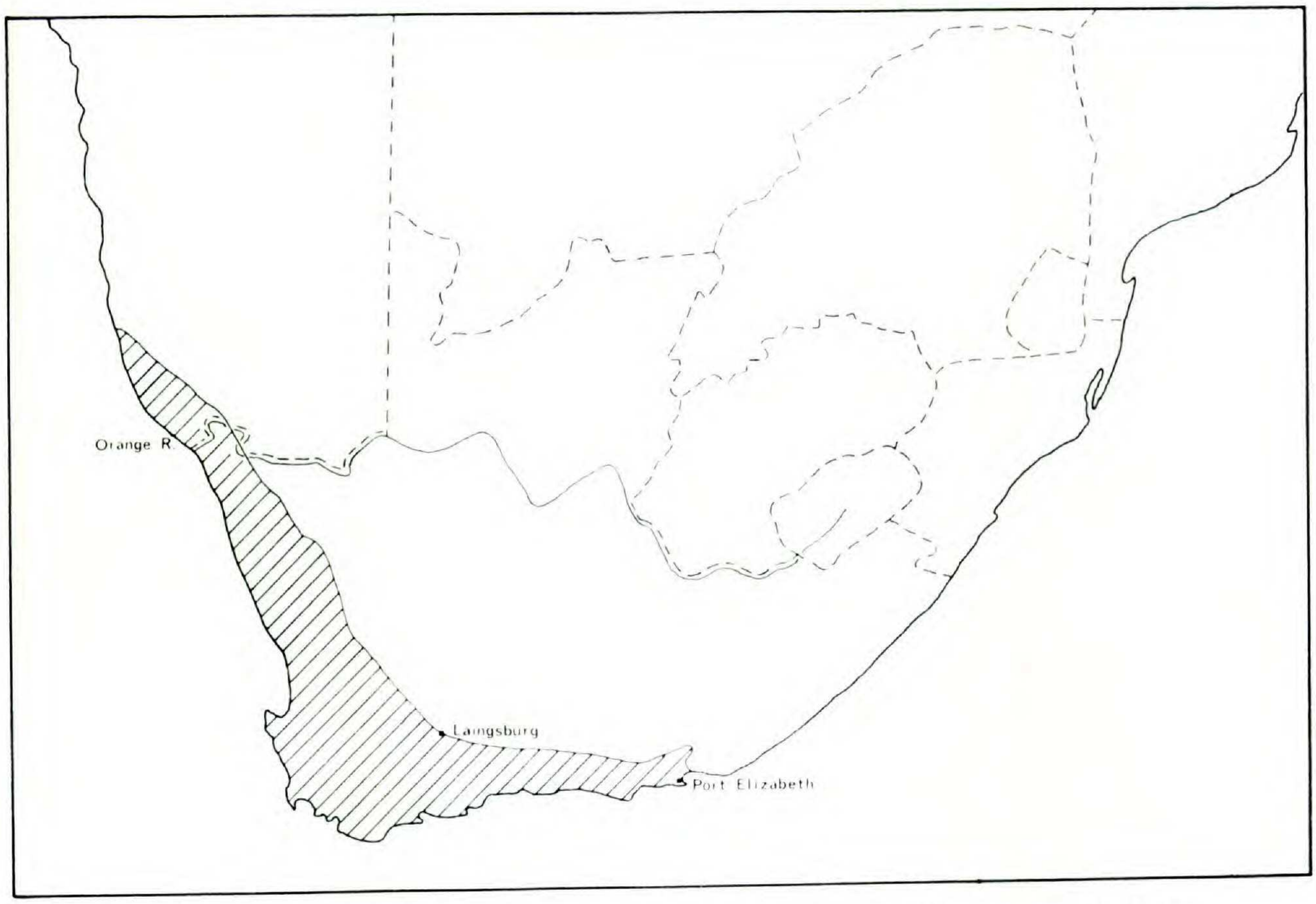

FIGURE 1. Map of South Africa showing the winter rainfall region (shaded).

DEFINITION OF THE SUMMER RAINFALL AREA AS DEALT WITH HERE

In the present treatment, 26 species and one subspecies of a species typical of the winter rainfall area are recognised as summer rainfall representatives, but several more occur within this zone, although these are predominantly winter rainfall species. To accurately define the limits of the summer rainfall region is not possible, for there is considerable overlap of summer and winter rainfall cycles in the eastern Cape and in the karoo, and of course, areas of the southern Cape may receive rain all year round. In these areas, several members of the genus typical of one or other rainfall type occur together, each responding to the appropriate season. Somewhat arbitrarily, a dividing line has been drawn from Port Elizabeth in the south, through Laingsburg, and then northwards to the Orange River. The region to the west of this line is not dealt with here except in the case of *Moraea spathulata* which, though a typical member of the summer rainfall group, occurs as far west as the George district. This division (Fig. 1) is approximately equivalent to the line between areas receiving either more than 60% of their rain in summer or less than 60% of their rain in summer (Adamson, 1938).

A key has been designed to allow identification of all the species recorded or known to occur in what is regarded as summer rainfall area, but *Moraea ciliata*, *M. polyanthos*, and *M. viscaria*, which are clearly typical winter rainfall area elements, are not dealt with further.

OUTLINE OF TAXONOMIC HISTORY

The most complete general treatment of *Moraea* is found in *Flora Capensis* (Baker, 1896), the standard reference which is now quite out of date. In this work Baker recognised 45 species of *Moraea*. Two of his subgenera, *Dietes* and *Helixyra* (now *Gynandriris*), are at present regarded as separate genera, leaving 37 species of *Moraea*, of which only 8 are regarded as occurring in the summer rainfall area. Subsequent to *Flora Capensis* several species from the summer rainfall area were described, the most significant contribution being that of N. E. Brown (1929) who, although he dealt only with the Transvaal, recognised 17 species, 13 of these being new to science.

Brown's work is now also out of date, not only because he ignored species outside the Transvaal, but he tended to recognise far too many species, several of which, it is now clear, were identical. His work was, however, valuable in drawing attention to the genus in the Transvaal. No doubt the paucity of material available at that time and lack of knowledge of the living plants were a distinct handicap, and when this is appreciated, his work must be admired.

The way in which Brown dealt with species in his article on Transvaal Iridaceae would today be regarded as somewhat cavalier. The formal descriptions, even of new species, are poor or sometimes absent although types are clearly indicated, and it is only through the medium of the rather detailed key that species can be identified. This key must be regarded as embodying part, if not the entire description of some species. In spite of this treatment, all his species of *Moraea* have been identified quite readily and are all recognised as validly described, even though many have been reduced to synonymy here.

Subsequent to N. E. Brown's work, little attention was paid to the summer rainfall Moraeas until quite recently when J. Robert Sealy of the Royal Botanic Gardens, Kew, and then Mrs. A. A. Mauve of the Botanical Research Institute, Pretoria, began, through the medium of *Curis' Botanical Magazine* and *Flowering Plants of Africa* respectively, to revive interest (Sealy, 1965; Obermeyer, 1970*a*, *b*). Mrs. Mauve rediscovered and redescribed some of N. E. Brown's species as well as one quite new plant. Her studies and collections of *Moraea* over the years have helped considerably in elucidating the taxonomy of the genus, and the present author is much in her debt.

A NOTE ON SPECIES CONCEPTS

There is considerable difficulty in distinguishing and defining species of *Moraea* from the often poorly prepared herbarium specimens. All too frequently these are incomplete, usually with corms and prophylls lacking, or else flowers are crumpled and discoloured; thus it is inevitable that some specimens are misidentified. One particular characteristic, *i. e.* whether plants are solitary or grow in clumps, is regarded as extremely significant, but unfortunately this is often impossible to determine from herbarium material. Sometimes this is the only usable key character, as in distinguishing some forms of *M. moggii* and *M. spathulata*. If this is not obvious from the specimen, or if field notes are absent, determination is difficult.

In deciding whether a race merited taxonomic recognition, not only morpho-

logical characters were weighed, but factors such as distribution, flowering time, growth form, and habitat were considered. The value of these criteria assumes great importance in some groups. In the groups *Caeruleiflora* (comprising small, usually blue-flowered species) and *Grandiflora* (tall, usually yellow-flowered species), flower morphology is often similar in related races or at least indistinguishable in dried specimens, so that vegetative characters and whatever other information can be obtained, must be considered. In contrast, in the group *Vieusseuxia*, flower morphology, especially the nature of the inner perianth segments is so distinctive as to leave little doubt about species limits and therefore ecological data are not so important in classification. This is not to suggest that species are any less "good" in some sections, and in fact when working primarily from dried material, it is difficult to determine whether or not too broad a view of the group is being taken, leading to the recognition of too few or too many species. In such cases the practical aspects of taxonomy are a consideration in deciding the rank of a race or taxon which, although recognisable, has no good diagnostic feature.

Description and Morphology of the Genus

Moraea is treated by most authors as a member of the tribe (or subfamily) Irideae and as a close ally of the Northern Hemisphere genus *Iris*. There is little doubt that *Iris*, *Dietes*, and *Gynandriris* are all closely related to *Moraea*, and care must be taken to ensure that plants believed to be *Moraea* are not confused with these genera. *Moraea* can be distinguished from *Iris* and *Dietes* by the nature of the rootstock, which is invariably a corm in *Moraea*, whereas *Iris* and *Dietes* have a rhizome or bulb; and from *Gynandriris* in which there is a sterile prolongation of the ovary forming a pseudo-perianth tube. The often-mentioned difference between *Iris* and *Moraea*, the presence or absence of a perianth tube, is not an invariable distinction, for *M. cooperi* has a well developed perianth tube, while in some species of *Iris* this character may be poorly developed.

THE CORM

The corm is derived from a lateral bud formed on the lowermost or lower nodes of the scape and is one internode long with a bud at its apex. The adventitious roots arise just below the bud, *i. e.* near the apex of the corm. It is covered by a tunic, *i. e.* a special leaf covering the corm alone, and often by other materials derived from the decaying remains of previous seasons' leaf bases, prophylls, and corm tunics.

THE FOLIAR APPENDAGES

There are three different types of leaf structures produced in *Moraea*, the prophylls, *i. e.* brown, dry, sheathing basal leaves, a produced green leaf or leaves, and short bract-like leaves which are entirely sheathing and have no free apex.

Prophylls: Up to four in number, these sheath the underground part of the scape and seldom extend much above ground level. They are membranous to rigid, pale to dark brown and may be entire, irregularly broken, or fibrous, all these features being of considerable taxonomic value (Fig. 2).

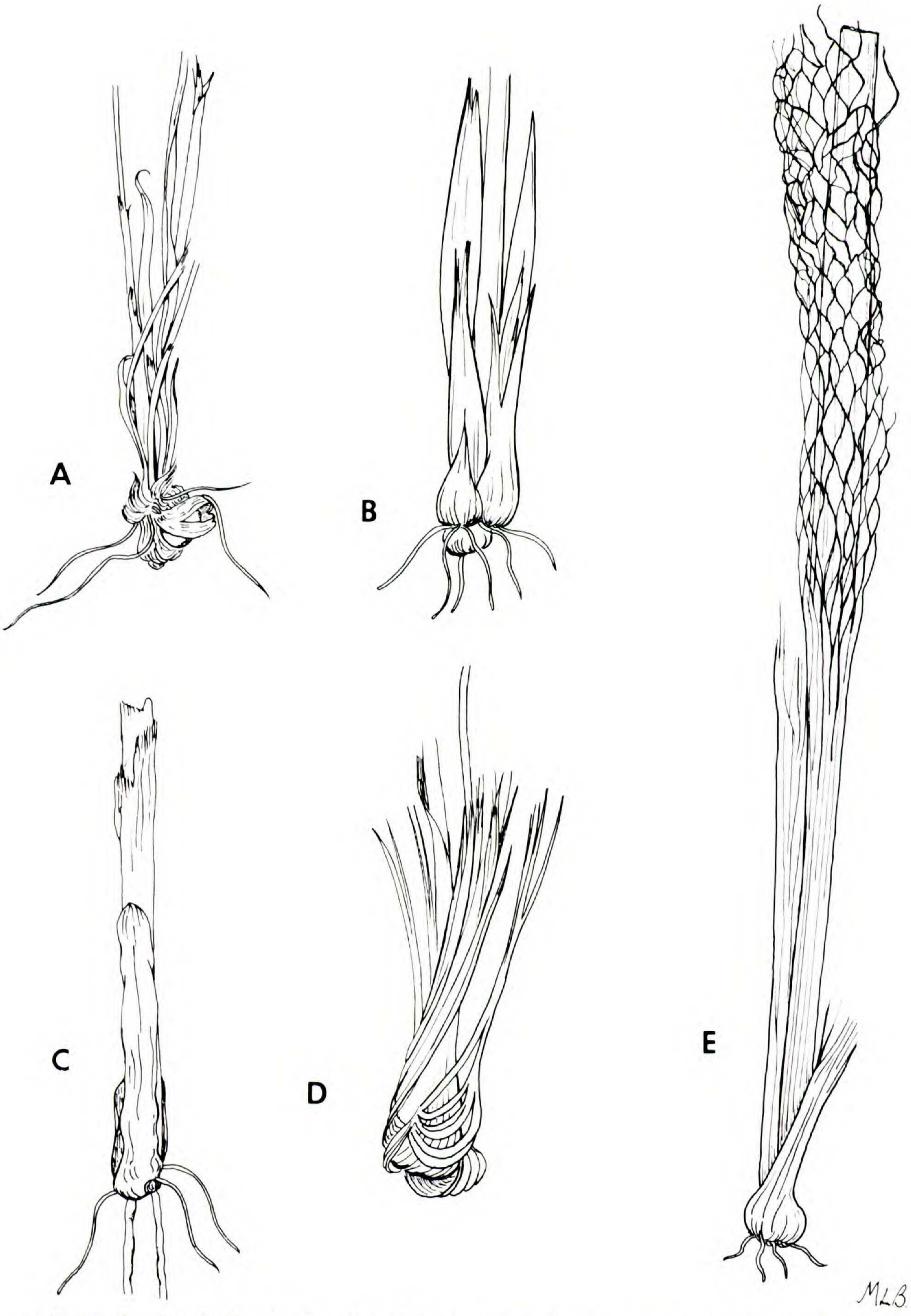

FIGURE 2. Prophylls of the *Grandiflora* group of *Moraea*.—A. *M. muddii*.—B. *M. spathulata* subsp. *transvaalensis*.—C. *M. graminicola*.—D. *M. galpinii*.—E. *M. alticola*. [A and D × ⅔; B, C and E × ⅓.]

Produced leaves: The major assimilatory organs are the long, well developed leaves inserted on the stem at any point from ground level to the base of the inflorescence. The base of the leaf completely sheaths the scape, but distally it is free, usually linear and dorsiventral with a short equitant apex. The leaf number is usually constant in a species, and the number can range between one and six. The majority of summer rainfall Moraeas have only a single leaf.

Bract leaves: These foliar organs are reduced leaves which sheath the scape. Produced at nodes, they sometimes subtend branches, but the latter are often absent. The bract leaves completely sheath the scape above the node with only the acute apex free. Although usually green and herbaceous, the bract leaves often have a dry scarious apex. Where the aerial part of the scape is poorly developed, there is little distinction between the bract leaf and true leaf, as in *Moraea ciliata.*

THE SCAPE

The aerial part of the stem is termed the scape here and is considered the peduncle of the inflorescence. The degree of branching is very variable in the genus, and the nature and number of branches were the main criteria used by Baker (1892) in dividing the genus into sections. This character is used to some extent in the present paper, as in distinguishing the group *Acaules* where the scape does not grow above ground.

THE INFLORESCENCE

The inflorescence in *Moraea* is cymose in development. There is a variable number of flowers per inflorescence, ranging from up to 20 in *M. ciliata* to only one in *M. cooperi.* The inflorescence is enclosed in two opposed bracts termed spathes here, and these generally resemble the bract leaves closely. In addition to the spathes, the individual flowers are also subtended by smaller transparent membranous bracts which are seldom visible, being enclosed in the larger spathes. The flowers are borne one by one and are extruded from the spathes on a slender pedicel. The fruit develops either outside the inflorescence spathes as in most species, or within the spathes as in members of section *Acaules* where the pedicel contracts after flowering has occurred.

THE FLOWERS

Perianth. The flower of *Moraea* is, although variable, the feature which defines the genus (Fig. 3). The flowers are actinomorphic, lack a perianth tube, except in *M. cooperi* (a winter rainfall species), and have unguiculate petals or perianth segments. The outer three are usually larger, the claw slender and bearded, and the limb reflexed and hanging downward. At the base of the limb there is usually a prominent "eye" or nectar guide. The inner petals are more variable. They are typically held erect, though the limb may be held outwards or be reflexed like the outer petals as in *M. inclinata* and *M. polystachya.* In other species the inner petals are reduced so that there is no expanded limb, or the apex may be three-lobed or three-pronged (species in the group *Vieusseuxia*) (Fig. 3).

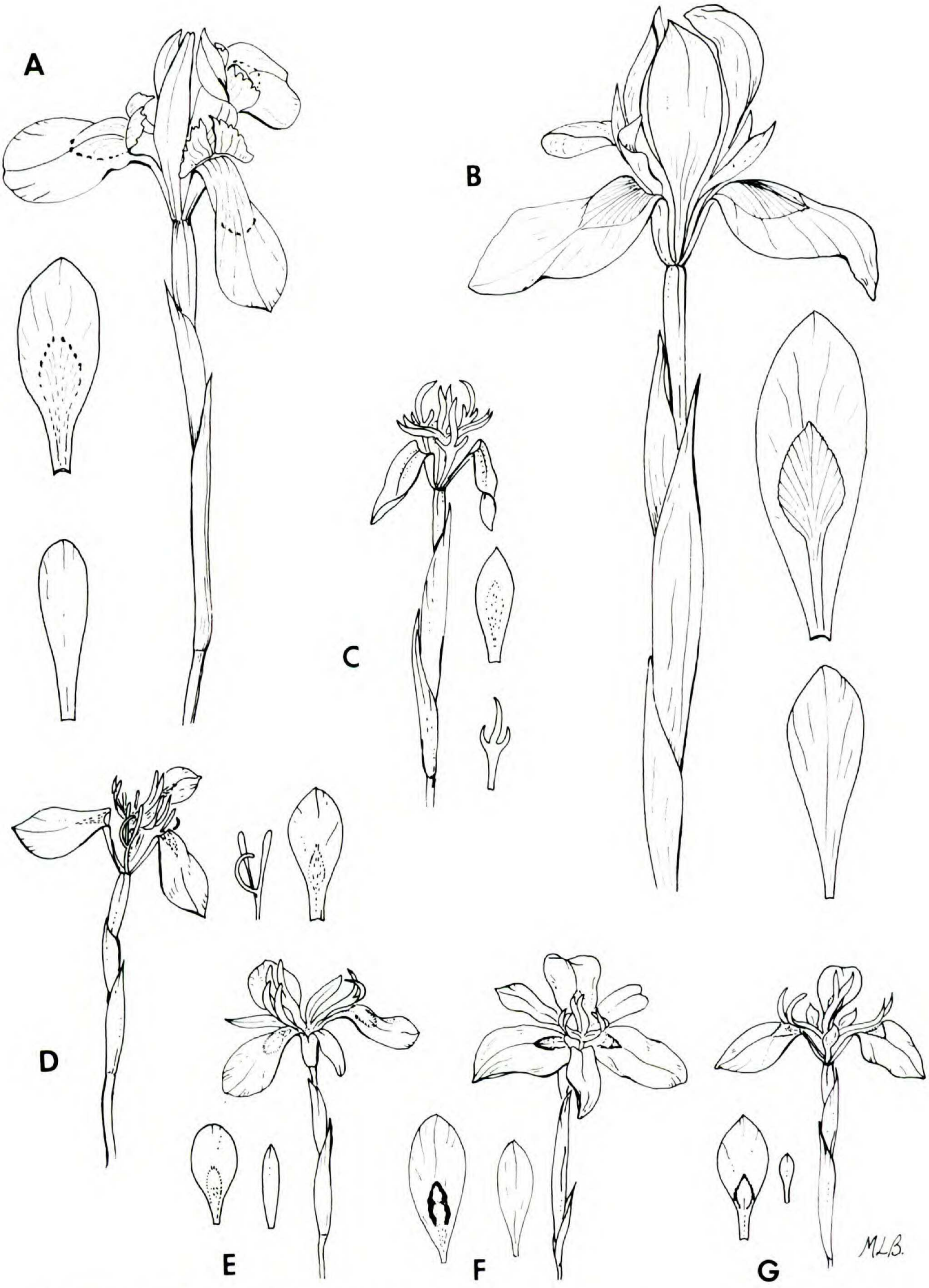

FIGURE 3. Flowers and perianth segments of summer rainfall species of *Moraea*.—A. *M. huttonii*.—B. *M. spathulata* subsp. *spathulata* (both group *Grandiflora*).—C. *M. trifida*.—D. *M. pubiflora* subsp. *brevistyla* (both group *Vieusseuxia*).—E. *M. elliotii*.—F. *M. inclinata*.—G. *M. algoensis* (last three all group *Caeruleiflora*). [All flowers about × ⅔.]

Stamens. The three stamens are similar in all species with the filaments, inserted opposite the outer perianth segments, being either free but contiguous in the lower part, or more often fused in the lower half. The anthers lie closely pressed against the style branches extending up to the stigma lobe, though in some species they exceed the stigma (*e. g. Moraea trifida*).

Gynoecium. The tricarpellate, inferior ovary is linear to clavate in shape, usually round in section, but triangular in some species. The style is short, dividing below the base of the anthers into three large, flat, petaloid style branches. The branches diverge, each lying fairly close or appressed to the claw of the outer petal. Near the apex of each style branch on the abaxial side are the stigmatic lobes, and above these the style branch forks to form two crests, which are usually long and well developed.

THE FRUITS AND SEEDS

The fruit is a loculicidal capsule which exhibits considerable variation in size and shape. Its taxonomic use is limited, because it is seldom collected and is even unknown in some species. The seeds are either small and angular and without an inflated testa (groups *Visciramosa*, *Caeruleiflora*, and *Vieusseuxia*), irregular in shape, with a soft spongy testa (group *Acaules*), or large, depressed and somewhat triangular or flattened, often with a somewhat spongy testa (group *Grandiflora*).

Subgeneric Classification

In his treatment of the genus in *Flora Capensis*, Baker divided *Moraea* into several subgenera and sections. As already mentioned, two of his subgenera, *Gynandriris* (as *Helixyra*) and *Dietes*, are now regarded is distinct genera, leaving *Moraea* and *Vieusseuxia*. These last mentioned were distinguished by the nature of the inner perianth segment, this in *Moraea* being a large, entire structure, while in *Vieusseuxia* it is small and often tricuspidate. This distinction does not hold for all species, and *Vieusseuxia* is not regarded as a distinct subgenus here. It is proposed instead that it be treated as a group of equal rank with several other groups of the genus. It is beyond the scope of this paper to revise the sections of the genus as established by Baker, because this would require detailed study of the winter rainfall species. Instead, all formal subgeneric ranks are ignored, and related species are treated together in groups. As the present paper deals with only 27 species in detail, there should be no difficulty in disregarding the formal ranks between genus and species. The groups are arranged as follows:

Group I: **Acaules**

This group corresponds to Baker's section *Acaules*. It comprises three species, only one of which occurs in regions receiving summer rainfall alone. The characteristic features are lack of aerial stem, similarity of leaves and spathes, and a contractile pedicel.

Group II: **Visciramosa**

Although predominantly a winter rainfall area group, one of the three to four species in the group, *Moraea viscaria*, occurs as far west as Grahamstown and must therefore be mentioned. The characteristics of the group are the sticky internodes and well developed branching the whole length of the scape.

Group III: **Caeruleiflora**

This group does not correspond exactly to any of Baker's sections, but includes species which he placed in both *Corymbosae* and *Subracemosae*. The group *Caeruleiflora* comprises species with small to medium sized blue flowers. Branching may be extensive or considerably reduced (Fig. 3E–G).

Group IV: **Vieusseuxia**

Baker's subgenus *Vieusseuxia* is treated as a group here, although its circumscription is somewhat altered. *Vieusseuxia* is closely allied to the group *Caeruleiflora* and a dividing line is difficult to draw. *Vieusseuxia* is characterised by reduced branching and modified inner perianth segments, which may be cusp-like, trifid, or absent (fig. 3C–D).

Group V: **Grandiflora**

This group comprises part only of Baker's *Monocephalae*. As shown by Goldblatt (1971) the *Monocephalae* are an artificial group, with the Cape elements *Moraea angusta* and allies not closely related, although they are morphologically similar. These Cape species are not regarded as belonging to the group *Grandiflora*, which as treated here occurs solely in the summer rainfall region with one species, *M. spathulata*, extending as far west as George in the southern Cape. The group is characterised by large, usually yellow flowers, very limited or no branching and depressed to disciform seeds (fig. 3A–B).

NOTE ON CITATION OF SPECIMENS

The arrangement of specimens examined, following the taxonomic treatment and discussion of each species, is based on the system currently gaining acceptance in South Africa (Edwards & Leistner, 1971). The system is based on a grid, and geographical degrees of latitude and longitude define each grid which is numbered accordingly. The one degree square grids are also designated by the name of a major town within it. Grids are divided into four quarters labelled from left to right A, B, C, or D and these quarter degree squares are again divided into four and labelled A, B, C, or D. Thus, all specimens are cited with data localising them to one-sixteenth of a degree square.

In one detail the method used here diverges from the usual in that countries and provinces are not stated. This is because many species occur along the borders of the provinces and of the small countries of Lesotho and Swaziland, so that: a) is often impossible to know in which area certain collections were made (this is especially true in the Drakensberg where many species occur along the border which Lesotho shares with Natal and the Cape); b) the citing of many grids in two areas would have been unnecessarily repetitive.

The herbarium of the Cathedral Peak Forest Station has been abbreviated as CPF and the herbarium at the University of Lesotho Swaziland and Botswana at Maseru as ROML.

Key to the Groups[3]

1. Produced leaves not distinct from bract leaves or inflorescence spathes; stem not or barely produced above ground, enclosed by leaves or bracts ..... Group II: Acaules
1′. Produced leaves distinct from bract leaves and inflorescence spathes; stem produced above the ground.
2. Plants much branched, branches parallel to stem for short distance, then bending at right angles; sticky below nodes ..... Group I: Visciramosa
2′. Plants unbranched or not branching as above; not sticky below nodes.
3. Inner perianth segments with an expanded limb, at least 1.5 mm wide, entire and not three-lobed or tricuspidate.
4. Produced leaves one only; outer perianth segments more than 3.5 cm long; if less, then yellow flowered ..... Group V: Grandiflora
4′. Either produced leaves more than 2 or if one only, then outer perianth segments less than 3.3 cm long and flowers blue ..... Group III: Caeruleiflora
3′. Inner perianth segments three-lobed to tricuspidate, or linear, without expanded limb, and less than 1.5 mm wide ..... Group IV: Vieusseuxia

Keys to the Species

Group I: Visciramosa

One species only, in the summer rainfall area, *Moraea viscaria*. It grows primairly in the winter rainfall region.

Group II: Acaules

1. Leaves glabrous: corm tunics of dark or black, fine, closely woven fibres ..... 1. *M. falcifolia*
1′. Leaves ciliate to pubescent; corm tunics of pale, coarse fibres ..... *M. ciliata*[4]

Group III: Caeruleiflora

1. Produced leaves more than one.
2. Outer perianth segments usually more than 3.3 cm long; flowering December to July ..... 2. *M. polystachya*
2′. Outer perianth segments usually less than 3.0 cm long; flowering August to October ..... *M. polyanthos*[4]
1′. Produced leaf solitary.
3. At time of flowering, leaf dead, or if newly emergent, then not attached to the flowering stalk.
4. Plants small, rarely to 10 cm high; inflorescence spathes less than 3 cm long; flowering in summer on Drakensberg summit plateau ..... 7. *M. alpina*
4′. Plants usually more than 12 cm high; inflorescence spathes more than 3 cm long; flowering in winter and spring, rarely in November, in grassland ..... 6. *M. stricta*
3′. Leaf present and well developed at time of flowering and attached to flowering stalk at ground level or above.
5. Leaf inserted on scape just below inflorescence (at least two-thirds of scape below leaf insertion).
6. Capsule spherical; outer spathe bracts deep brown, and less than half the length of inner spathe ..... 5. *M. inclinata*
6′. Capsule ovoid to clavate; outer spathe bracts green rarely uniformly brown and at least half the length of the spathe.

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[3] With regard to dimensions of floral characters it must be stressed that wherever possible measurements were made from live material or carefully laid out floral parts. Poorly dried flowers invariably appear smaller than in life and this must be borne in mind when using the key.

[4] Primarily a winter rainfall area species which is not dealt with in this paper.

7. Inflorescence more than 3.5 cm long; outer perianth segments more than 2 cm long ..... 3. *M. elliotii*
7′. Inflorescence usually less than 3.5 cm long (rarely to 4 cm); outer perianth segments rarely to 2 cm long ..... 4. *M. natalensis*

5′. Leaf inserted near ground level, rarely higher up (but usually at least one-half of scape above the leaf).
8. Inner perianth segments less than 1.2 cm long; limb comparatively broad ..... 8. *M. algoensis*
8′. Inner perianth segments more than 1.2 cm long; linear-lanceolate, with limb not distinctly enlarged above ..... 3. *M. elliotii*

Group IV: VIEUSSEUXIA

1. Inner perianth segments entire, not divided into distinct lobes.
2. Outer perianth segments more than 2.5 cm; flower white ..... 10. *M. albicuspa*
2′. Outer perianth segments less than 2.5 cm; flower white veined with mauve ..... 12. *M. modesta*

1′. Inner perianth segments divided into three distinct lobes or cusps.
3. Inner perianth segments comprising one long central cusp and two small lateral lobes.
4. Plant leafless when flowering, if leaf present then not attached to flowering stalk.
5. Inner perianth segments more than 1 cm long, reaching above stigmas ..... 14. *M. marionae*
5′. Inner perianth segments less than 1 cm long, not reaching stigmas ..... 12. *M. modesta*

4′. Basal green leaf present at flowering time and attached to flowering stalk.
6. Cusp of inner segment erect; outer segments seldom more than 6 mm wide ..... 13. *M. trifida*
6′. Cusp of inner segment incurved or spirally twisted; outer segments usually more than 10 mm wide ..... 15. *M. bellendenii*

3′. Inner perianth segments consisting of one long, slender, acute central cusp and two long, obtuse lateral cusps.
7. Inner perianth segment spotted or white ..... 9. *M. pubiflora*
7′. Inner segments uniform blue-purple ..... 11. *M. dracomontana*

Group V: GRANDIFLORA

1. Prophylls submembranous, white to pale, entire or frayed or torn at apex only.
2. Plants always solitary in low altitude grassveld; flowering in spring or summer, occurring in Natal and eastern Cape ..... 21. *M. graminicola*
2′. Plants solitary or in small clumps on rocky hilltops; flowering summer; occurring in the Transvaal ..... 25. *M. spathulata* subsp. *saxosa*

1′. Prophylls brown to black, entire or irregularly broken or fibrous.
3. Prophylls of flowering individual split regularly into rigid, dark brown-black, vertical bristles, innermost prophyll not forming a network above ..... 22. *M. galpinii*
3′. Prophylls of flowering individual brown to black, brittle, entire or irregularly broken, but not forming rigid vertical bristles, or innermost sheath sometimes forming a brown to pale reticulum above (old, outer prophylls sometimes becoming fibrous).
4. Occurring along watercourses; rarely solitary; style crests marked with a dark contrasting blotch at base ..... 27. *M. huttonii*
4′. Not occurring along watercourses; solitary or in clumps; style crests not marked at base.
5. Flowers not predominantly yellow to white, but either pink, mauve, blue, or grey.
6. Filaments longer than anthers; flowers marked and flushed flesh pink to purple ..... 19. *M. carnea*
6′. Filaments shorter than anthers; flowers slate blue to mauve ..... 20. *M. ardesiaca*
5′. Flowers white to yellow.
7. Plants fairly small, seldom exceeding 40 cm; solitary; basal leaf slender, glaucous; usually less than 6 mm broad; outer perianth segments rarely more than 4.5 cm long.

8. Bract-leaves one only ..... 18. *M. unibracteata*
8′. Bract-leaves more than one ..... 17. *M. muddii*

7′. Plants large, seldom below 50 cm; solitary or in clumps; basal leaf rarely less than 5 mm wide; outer segments up to 8 cm long, rarely less than 4.5 cm.
9. Leaf terete (with narrow adaxial groove), margins inrolled; solitary in grassland in Natal midlands ..... 23. *M. hiemalis*
9′. Leaf flat to canaliculate, not terete; solitary or in clumps.
10. Prophyll produced upwards forming a well-developed, pale, fibrous network around lower part of leaf.
11. Leaf surface flat, margins usually thickened; plants growing in clumps ..... 26. *M. alticola*
11′. Leaf surface canaliculate, margins not thickened; plants usually solitary ..... 24. *M. reticulata*
10′. Prophyll not forming a network round base of leaf, or if network produced, then poorly developed and plants caespitose with canaliculate leaves.
12. Plants solitary with slender canaliculate leaf ..... 16. *M. moggii*
12′. Plants growing in clumps, rarely solitary; leaf flat to canaliculate ..... 25. *M. spathulata*

Group I: Visciramosa

Only one species of this group occurs in the summer rainfall region, namely *Moraea viscaria* (Thunb.) Ker. It is primarily a winter rainfall region species but extends eastwards to the Port Elizabeth-Grahamstown area. As it is not a true member of the summer rainfall flora, it is not dealt with further.

Group II: Acaules

1. **Moraea falcifolia** Klatt, Erganz. 32. 1882. Type: "Hantam Geb.," *Meyer s. n.* (B, holotype; S, isotype).

Moraea fasciculata Klatt, Erganz. 32. 1882. Type: "Langevaley," *Drége 2600* (B, holotype; K, P, S, isotypes).
Moraea galaxioides Baker, Handbook Irid. 49. 1892. Type: Transvaal, *Barber s. n.* (K, holotype).

Plants small, to 5 cm high, forming a sessile rosette. *Corm* conical, covered by strong coarse dark reticulate fibres, often bearing numerous cormlets at the base. *Prophylls* membranous, transparent. *Leaves* several, some indistinguishable from inflorescence spathes, slender, canaliculate, to 10 cm long, loosely coiled or linear, margins frequently undulate. *Stem* not produced above ground, simple or branching at or below ground to give rise to one to several inflorescences. *Flowers* (poorly known) white to cream with yellow nectar guides, pedicel contractile, shrinking after flower dies; *outer perianth segments* 1.5–2.2 cm long, claw somewhat less than half the length, claw to 1.5 cm wide; *inner segments* 1.3–2 cm long. *Filaments* to 6 mm long, joined in the lower half, anthers 3–4 mm long, white. *Style* about 5 mm long, branches to 8 mm and crests to 6 mm long. *Ovary* clavate, capsule borne near ground level, soft walled, rotund, about 1 cm long. *Seeds* small and spherical or slightly angled.

Flowering time: May to November.

Distribution: Throughout the northwestern Cape, karoo, and in the northern Cape and western Transvaal (Fig. 4).

This species can easily be recognized by its dwarf, stemless habit. The

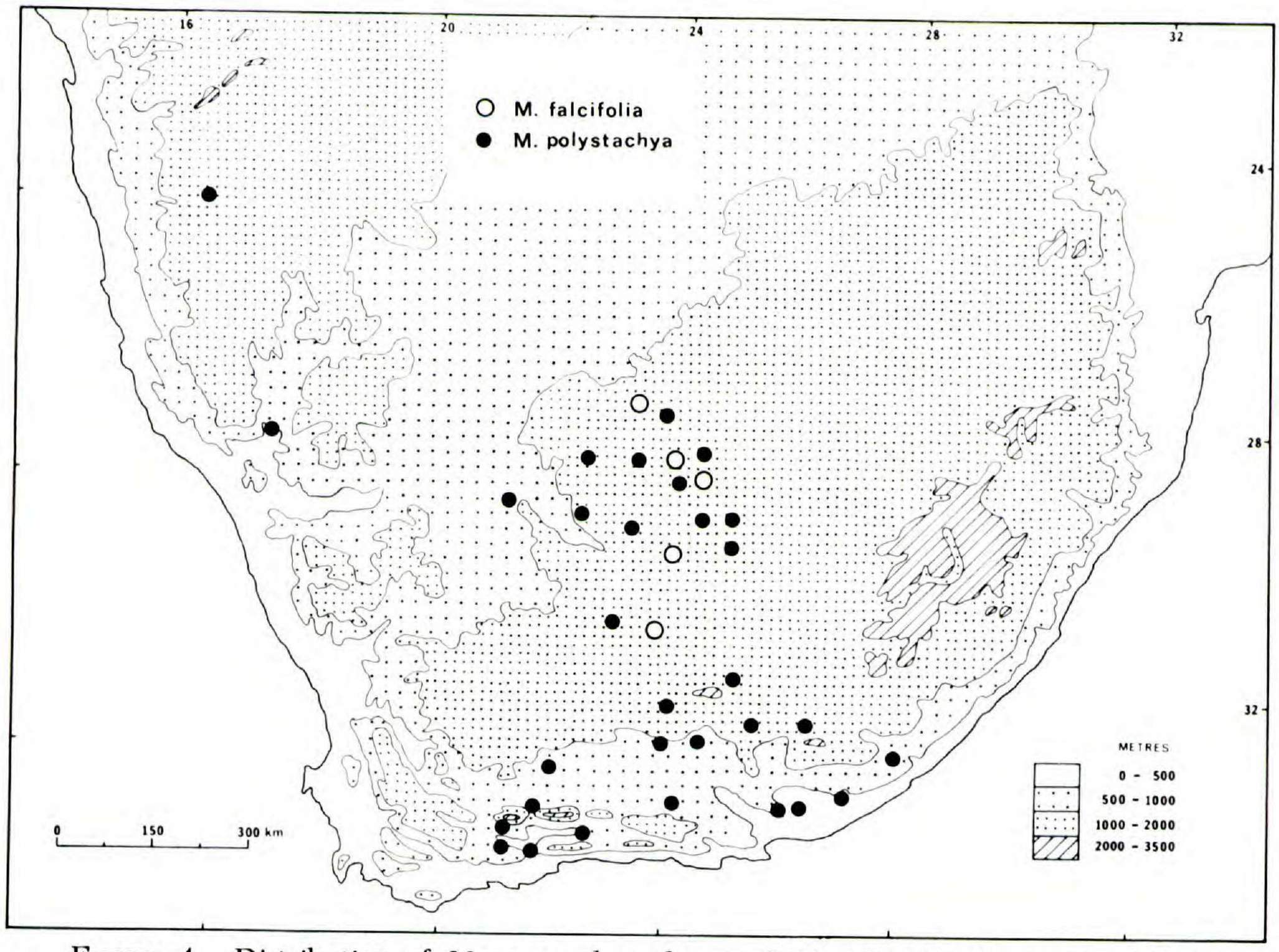

FIGURE 4. Distribution of *Moraea polystachya* and *M. falcifolia* (summer rainfall area only).

flowers are extremely fugaceous and are thus not well known although the plant has been collected frequently. The peculiar character of the contractile pedicel is also found in *Moraea cilata*, a related species occurring widely in the winter rainfall area and the margins of the summer rainfall area.

Moraea fasciculata is reduced to synonymy here. This species, the type of which was collected in the Langevlei area near Lambert's Bay on the west coast of the Cape Province, is a more slender form of *M. falcifolia*. This form does not appear to differ fundamentally from *M. falcifolia*, slender individuals of which may also be found in some populations.

Moraea galaxioides, also treated here as conspecific with *M. falcifolia*, appears to represent the extreme eastern form of the species. The type of *M. galaxioides* was collected in the western Transvaal and is a form with shorter, more rigid leaves. Specimens matching these occur at Kimberley, while further west in the Barkly West district, plants have larger leaves and can barely be distinguished from the winter rainfall area populations. A close examination of plants in the northeastern Cape reveals a cline in which leaves grade from the falcate or loosely coiled and undulate-margined type to a short, more rigid type towards the extreme eastern part of the range.

27.23 (Kuruman): Batlharos (-AD), *Silk 67* (BOL).
28.24 (Kimberley): Witfontein, Barkly West, *Acocks 2482* (BOL); Diamond Fields, *Tuck s. n.* (K); Klip Drift, Vaal River (-DA), *Barber s. n.* (K).
29.24 (Hopetown): Newlands, Barkly West (-AD), *Paton s. n.* (BOL 30838).
30.24 (De Aar): De Aar (-CA), *Wilman s. n.* (BOL 13940).

Group III: Caeruleiflora

2. **Moraea polystachya** (Thunb.) Ker, Ann. Bot. (König & Sims) 1: 240. 1805.

Iris polystachya Thunb., Diss. Iride no. 40. 1782. Type: *Thunberg* in Herb. Thunb. (UPS).
Moraea toxicaria Dinter, Feddes Repert. 19: 237. 1923, *nom. nud.*
Moraea venenata Dinter, Feddes Repert. 19: 238. 1924. Type: Bullsport, S.W.A., *Dinter 2141* (SAM, isotype).
Moraea polystachya var. *brevicaulis* Stent *ex* Phillips, Bot. Survey S. Africa Mem. 9: 16. 1926. Type: Stent & Curton, Bull. Dept. Agric. S. Africa 1922(6): *fig. 2.* 1922.

Plants medium to large, to 80 cm high. *Corm* to 5 cm in diameter, covered with hard, dark coarse fibres. *Prophylls* to 3, membranous, truncate. Leaves 3–5, linear, canaliculate, to 50 cm long and 0.6–2 cm wide. *Bract leaves* 6–12 cm long, dry in old plants. *Scape* erect, much branched. *Inflorescence* to 6 cm long, spathes green or turning brown, outer shorter than inner. *Flowers* blue with yellow to orange nectar guides; *outer perianth segments* to 5.5 cm long and to 2.5 cm wide; *inner segments* to 4.5 cm long and about 1.5 cm wide, reflexed. *Filaments* joined to apex, to 1 cm long; *anthers* about 1 cm long. *Style* 1 cm long, branches about 1 cm and crests to 2 cm long. *Ovary* clavate, surface wrinkled and red-veined; *capsule* ovoid, about 1 cm long; seeds, small, firm, angled. *Chromosome number* $2n = 12$, Riley (1962); *Goldblatt 88* (J), *221* (BOL); *Tolken 3985* (BOL).

Flowering time: Autumn and winter (December) March to July (August).

Distribution: Widespread in karoid regions, but occurring also in South West Africa, the eastern and northern Cape, western Orange Free State and western Transvaal (Fig. 4).

Icones: Batten & Bokelmann, Wild Flowers of the Eastern Cape Province, *Tab. 34, fig. 1.* 1966; Marloth, Flora of S. Africa 4: *Tab. 39A.* 1915; Obermeyer, Fl. Pl. Africa 35: *Tab. 1385.* 1962; Stent & Curton, Bull. Dept. Agric. S. Africa 1922(6): *fig. 2.* 1922.

Moraea polystachya is a common and widespread species. It has long been known to be poisonous to cattle. Some morphological variation occurs locally, and this is particularly noticeable in the number and width of the leaves; flower size is less variable. The variety *brevicaulis* figured by Stent (Bull. Dept. Agric. S. Africa 6) and described by Phillips, is not recognised here, as this dwarf form is known to occur occasionally as a seasonal variant in areas where plants are normally tall. It is not known whether the dwarf habit is always a seasonal response or whether some populations are invariably short.

The two species described by Dinter, *Moraea toxicaria* and *M. venenata*, from South West Africa, are treated as synonyms following Sölch (1969). Both fall within the range of form found in *M. polystachya*.

The closest ally of *Moraea polystachya* is *M. polyanthos* (Thunb.) Ker, which occurs in the Little Karoo and adjacent areas north of the Swartberg and flowers in the spring, usually during September and October. The distribution of the two species does overlap to a limited extent, but the flowering time, while not completely distinct, serves to isolate the species. *Moraea polyanthos* is a generally smaller plant with usually only three narrow leaves and smaller flowers than those of *M. polystachya*. A critical analysis of *M. polyanthos* is beyond the scope

of this paper, but it is clear that a detailed study of this species is required to determine its relationship with *M. polystachya.*

A second species, *Moraea carsonii* Baker, which occurs in central Africa, also bears a strong resemblance to *M. polystachya.* Though generally smaller in most characters, *M. carsonii* is remarkably similar to *M. polystachya.* This central African species awaits detailed study.

24.16 (South West Africa): Bullsport (-AB), *Strey 2061* (BOL), *Strey s. n.* (BOL 30835).
27.17 (South West Africa): Huns mountains (-CA), *Tolken 3985* (BOL).
28.21 (Upington): Between Upington and Keimos (-CA), *Glover s. n.* (BOL 13366).
28.22 (Glenlyon): Andriesfontein (-BA), *Rogers s. n.* (BOL 12588); Bingap (-CD), *Acocks 5770* (BOL).
28.23 (Griekwastad): Danielskuil (-BA), *Lawson s. n.* (BOL 30837).
28.24 (Kimberley): Windsorton (-BC), *Hall 649* (NBG); near Kimberley (-DB), *Potgieter 1470* (BOL), *Lewis 304* (SAM).
29.23 (Douglas): Mazelsfontein (-BA), *Anderson 545* (BOL).
29.24 (Hopetown): Modder River (-BB), *Harris s. n.* (BOL 30834).
29.25 (Jagersfontein): Petrusburg (-AB), *Potts 1370* (BOL); Fauresmith (-CB), *Henrici 2749* (BOL).
30.23 (Britstown): Giesenskraal (-CB), *Wilman s. n.* (BOL 30836).
31.23 (Victoria West): Near Murraysburg (-D), *Tyson 329* (BOL).
31.25 (Steynsburg): Grootfontein, Middelburg (-AC), *Gill 225* (BOL).
32.24 (Graaff Reinet): Near Aberdeen (-AC), *Taylor 464* (BOL); near Graaff Reinet (-BC), *H. Bolus 42* (BOL).
32.25 (Somerset East): Near Cradock (-BA), *F. Bolus s. n.* (BOL 30833).
32.26 (Fort Beaufort): Ventersdrift, Upper Kei, *Wells sub Galpin 6847* (BOL).
32.27 (Stutterheim): Kabousie River near Komgha (-DB), *Flanagan 1803* (BOL).
33.20 (Montagu): Wittepoort (-AD), *Esterhuysen 3503* (BOL); Riet Kloof, Laingsburg (-B), *Lewis 716* (SAM); between Ratelfontein and Montagu (-C), *Lewis 4428* (SAM); near Barrydale (-D), *Compton 19623* (NBG); near Lemoenshoek (-DD), *Leighton s. n.* (BOL 21735).
33.21 (Ladismith): Roodeberg summit (-DA), *Lewis 737* (SAM).
33.24 (Steytlerville): Near Steytlerville (-A), *Compton 19635* (NBG).
33.26 (Grahamstown): Alicedale (-AC) *Potts 983* (BOL); Grahamstown (-BC), *Rogers 27740* (BOL), *Schonland 1652* (SAM).
33.27 (Peddie): Peddie (-AA), *Barker 7822* (NBG).
Doubtful locality: Transvaal, *McLea s. n.* (BOL 5789).

3. **Moraea elliotii** Baker, Handbook Irid. 58. 1892. Type: Marshes near Lake Chrissie, *Scott-Elliot 1592* (K, holotype).—FIG. 3E.

Moraea macra Schl., Jour. Bot. 36:377. 1898. Type: Queenstown, *Galpin 2193* (B, holotype, BOL, PRE, isotypes).
Moraea stewartae N. E. Br., Trans. Roy. Soc. S. Africa 17: 346. 1929. Type: Hlatikulu, Swaziland, *Miss Stewart 44*, (K, holotype, PRE, isotype).
Moraea violacea Baker, Bull. Herb. Boiss., sér. 2. 1: 863. 1901. Type: Byrne, Natal, *Wood 5220* (Z, holotype, BM, isotype).
Moraea juncifolia N. E. Br., Trans. Roy. Soc. S. Africa 17: 346. 1929. Type: Saddleback, *Galpin 859* (K, holotype, SAM, isotype).

Plants medium in size, reaching to 55 cm in height. *Corm* to 2 cm in diameter, tunics of dark brown fairly coarse fibres often forming a neck extending upwards a short distance. *Prophylls* membranous. *Produced leaf* linear to terete with adaxial groove usually present, exceeding the inflorescence; leaf inserted above ground level, rarely more than halfway up the stem. *Bract leaves* 1–4, 2.5–6 cm long, herbaceous with dry, brown, acute apex. *Scape* usually erect and bearing to 8 branches; branches held erect, upper part held away from axis. *Inflorescence*

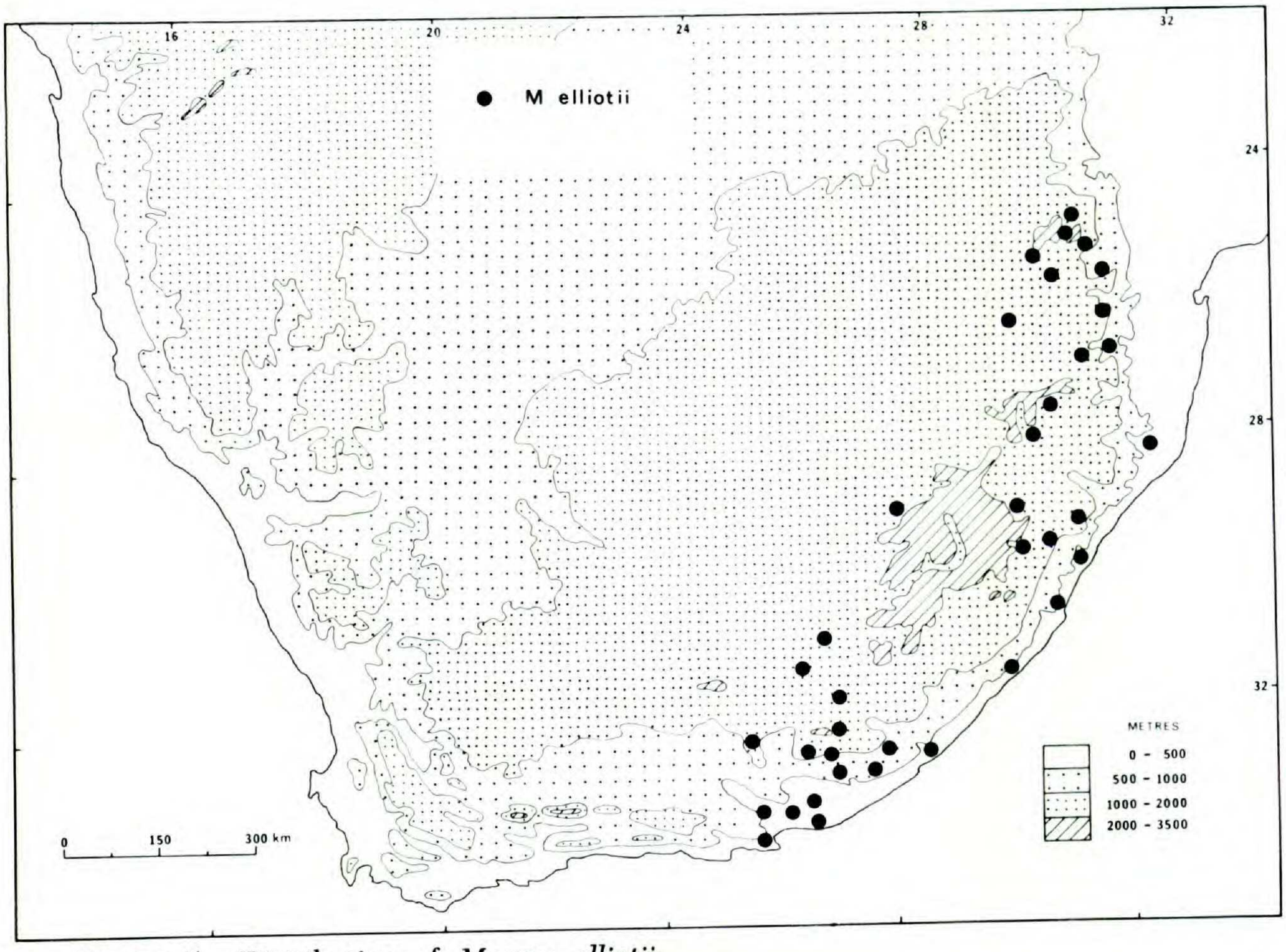

FIGURE 5. Distribution of *Moraea elliotii*.

spathe to 6 cm long, usually about 4.5 cm; inner spathe herbaceous, with a brown membranous apex and margin; outer spathe shorter than inner by 1 cm, frequently brown almost to the base. *Flowers* blue to violet with orange-yellow nectar guides; *outer perianth segments* 2–3 cm long, limb to 1.5 cm long and to 1.2 cm broad; *inner perianth segments* 1.5–2.4 cm long and 2–4 mm wide, linear-lanceolate. *Stamens* joined at base. *Style* branching near base, branches about 1 cm long, crests to 0.5 cm long. *Capsule* clavate, to 1.2 cm long and 0.4 cm wide; *seeds* small, angled. *Chromosome number* $2n = 12$, *Lewis 6306* (MO) as *M. setacea*; $= 24$, *Goldblatt 840* (BOL).

Flowering time: September to March, usually late spring in the south and summer to autumn in the north.

Distribution: Widespread, from the eastern Cape, throughout Natal and in Swaziland and the eastern Transvaal (Fig. 5).

Moraea elliotii is treated in the present paper in a very wide sense and several closely allied species have been reduced to synonymy. The type specimen and plants of other collections from the Transvaal highveld have a linear leaf inserted high up on the stem, but not immediately under the inflorescence as in *M. natalensis*. Specimens corresponding to *M. stewartae* tend also to have a linear leaf inserted above ground level, but the position of insertion is variable. A third species, *M. juncifolia*, also varies in the position of insertion of the leaf in the stem. The leaf in the latter species is terete or subterete. The three species mentioned above all occur in the Transvaal and Swaziland and generally flower from December to March.

Closely matching *Moraea juncifolia* with its terete leaf is *M. violacea*, the type from Byrne, Natal. Other specimens from the Natal midlands correspond to this form, and generally have the leaf inserted near groundlevel. The leaf varies from terete to linear. In Natal, plants generally flower in late spring. Further south in the eastern Cape, forms of *M. elliotii* flower earlier, from September onwards. In the eastern Cape forms corresponding to *M. macra*, leaf insertion is usually basal but the leaf may either be linear or terete.

The flowers and the corms of all the species now placed in *Moraea elliotii* are very similar, the former being small and blue with yellow-orange nectar guides. Branching is variable and though it can generally be said that the northern forms are fewer branched, many exceptions occur.

It was originally believed by the author that *Moraea elliotii* could be divided into subspecies or even two separate species, but no consistent differences could be found between the southern, somewhat smaller, more branched forms with a basal leaf insertion and the northern forms which are usually larger, less branched, and have a variable position of leaf insertion.

Moraea elliotii is most closely related to *M. stricta*, but this is an early flowering species which is easily distinguished by the absence of a green leaf when it is in flower. The forms of *M. elliotii* with the leaf inserted high on the stem can be confused with *M. natalensis*, but the latter is a more slender plant with very small flowers, and the leaf is inserted at the base of the inflorescence. *Moraea elliotii* is frequently confused in herbaria with *M. setacea*, which is actually a species of *Gynandriris*. The cause of the mistaken determinations is not clear.

24.30 (Pilgrim's Rest): Black Hill, Pilgrim's Rest (-DC), *Galpin 14326* (BOL, PRE).

25.30 (Lydenburg): Dullstroom (-AC), *Galpin 13070* (BOL, PRE); *Noome s. n.* (PRE 20796); Mount Anderson (-BA), *Mauve 4903* (PRE); near Sabie (-BB), *Brent 103* (PRE); Devils Knuckles, *Wilms 1418* (P); near Waterval Boven (-CB), *Reynolds 2311* (PRE).

25.31 (Komatipoort): Golden Crescent Mountain (-C), *Galpin 859* (PRE, SAM).

26.29 (Bethal): Spitskop, Ermelo (-BD), *Pott s. n.* (PRE 15143).

26.30 (Carolina): Mooi Hoek (-DD), *Devenish 305* (PRE).

26.31 (Mbabane): Ukutula, Mbabane (-A), *Compton 24808* (NBG); Mbabane (-AC), *Burtt-Davy 2870* (BOL); Hlatikulu (-CD), *Compton 29504* (PRE), *Stewart s. n.* (PRE, SAM 2534).

27.30 (Vryheid): Naauwhoek district (-CB), *Devenish 1103* (PRE).

28.30 (Dundee): Dundee townlands (-AA), *Shirley s. n.* (NU 32312); Mpati Mountain, Dundee district, *Shirley s. n.* (NU 32328); Dundee airfield, *Shirley 119* (NU).

28.32 (Mtubatuba): Dukuduku (-AC), *Strey 5535* (NH); St. Lucia, *Louw 1948* (PRE).

29.27 (Maseru): Mamathes (-BB), *Jacot-Guillarmod 3008* (PRE).

29.29 (Underberg): Estcourt Plant Research Station (-BB), *Acocks 10756* (PRE); hills near Ladysmith (-DB), *Wood s. n.* (NH 4989).

29.30 (Pietermaritzburg): Noodsberg (-BD), *Ward 946* (NU); Oribi airfield (-CB), *Brayshaw 69* (NU); Merebank East, Durban (-DD), *Ward 5213* (NH, NU, PRE); Clairmont, *Wood 11580* (NH); near Umbilo, *Wood s. n.* (NH 20809); near Durban, *Wood 4943* (PRE).

30.26 (Aliwal North): Elands Hoek, Aliwal North (-DC), *F. Bolus 130* (BOL).

30.30 (Port Shepstone): Park Rynie (-BC), *Shepherd 14* (NH); Ifafa, *Handley 48* (NU).

31.26 (Queenstown); North of Molteno (-AD), *Theron 923* (PRE); Queenstown range (-DD), *Galpin 2193* (BOL, PRE).

31.29 (Port St. Johns); Port Grosvenor (-BD), *Strey 8877* (NH).

32.25 (Somerset East): Jakkalsfontein, Cradock, *Acocks 17515* (PRE).

32.26 (Fort Beaufort): South of Gardiners Drift (-BD), *Acocks 20110* (NBG, PRE);

Black Hill, Lovedale (-CB), *Barker 2768* (NBG); Gaikas Kop, Amatola mountains (-DB), *Grant 3082* (BOL); Alice (-DD), *Goldblatt 840* (BOL), *Barker 2181* (NBG).

32.27 (Stutterheim): Emtaleni, Kei road, *Ranger 407* (PRE); near Komgha (-DB), *Flanagan 786* (PRE, SAM); Berlin (-DC), *Marais 446* (PRE).

32.28 (Butterworth): Near Kei River mouth (-CB), *Flanagan 1814* (BOL, SAM).

33.25 (Port Elizabeth): Addo Park (-BC), *Liebenberg 6614* (PRE); Port Elizabeth (-DC), *Burtt-Davy 12023* (PRE).

33.26 (Grahamstown): Howison's Poort (-AD), *H. M. L. Bolus 14465* (BOL); Grahamstown (-BC), *Schonland 1506* (BOL); *Rogers 1535* (PRE); Bushman's River mouth (-DA), *Barker 1334* (NBG).

4. **Moraea natalensis** Baker, Handbook Irid. 56. 1892. Types: Natal, *Sanderson 253* (K, lectotype, S, isolectotype) and *Sutherland s. n.* (K).

Moraea parviflora N. E. Br., Trans. Roy. Soc. S. Africa 17: 346. 1929. Type: Tomson's vlei, Nylstroom, *Pole-Evans 19668* (K, holotype, PRE, isotype).

Plants 15–45 cm in height including leaf. *Corm* to 1.5 cm diameter, covered with tunics of dark brown to black fibres. *Prophyll* membranous reaching a few cm above ground. *Produced leaf* inserted high up on stem, just below inflorescence; at time of flowering shorter, more often overtopping the inflorescence, to 20 cm long, narrowly canaliculate to terete. *Stem* green, erect or leaning over, lowermost internode very long with the leaf inserted above it, remainder of stem much shorter, flexuously branched, rarely simple. *Bract leaves*, if present, seldom more than 2.5 cm long, usually dry, light brown. *Inflorescence* 2.5–3.5 cm long and 2–3 mm thick; inner spathe herbaceous with dry apex and margin, to 1 cm longer than outer; outer spathe dry, brown near apex, often lacerated, speckled lower down. *Flowers* lilac to mauve with yellow nectar guide ringed with dark mauve; *outer perianth segments* about 1.4–2 cm long, limb 7–14 mm long and to 10 mm wide, claw fairly narrow; *inner perianth segments* linear-lanceolate, to 1.5 cm long and 4 mm wide. *Stamens* branching almost at base, branches to 11 mm including crests, pressed against claw of outer segment. *Capsule* ovoid to clavate, 4.5–10 mm long and to 4 mm wide. *Seeds* angled.

Flowering time: Summer.

Distribution: Coastal to mid-altitudes in Natal and Transvaal (Fig. 6).

There is some variation in the species as circumscribed here. The type form occurs in Natal in the Pietermaritzburg area. Further north in the Transvaal, a slender form with a smaller capsule is found as typified by *Moraea parviflora* N. E. Br. from Nylstroom. Some plants from the area are much branched, but others resemble the Natal plants in having only a few branches. *Moraea parviflora* is reduced to synonymy here as there seems no justification for maintaining it as distinct.

Moraea natalensis is clearly allied to *M. inclinata* as can be seen from the similar habit with the leaf insertion high on the stem. The overall smaller size, in flowers as well as vegetative parts, and the differences in bracts, spathes and capsules do, however, make it easy to distinguish the two. The central African species *M. ericirosenii* Fries is allied to *M. natalensis*, and the relationship between these two species requires investigation.

24.28 (Nylstroom): Tomsons vlei, Nylstroom, *Pole-Evans s. n.* (PRE 19668); Geelhoutkop (-AD), *Breyer s. n.* (PRE 31518); Nylstroom (-CD), *van Dam s. n.* (PRE 9654).

24.30 (Pilgrim's Rest): Mac Mac Falls (-DD), *Almborn 744* (LD).

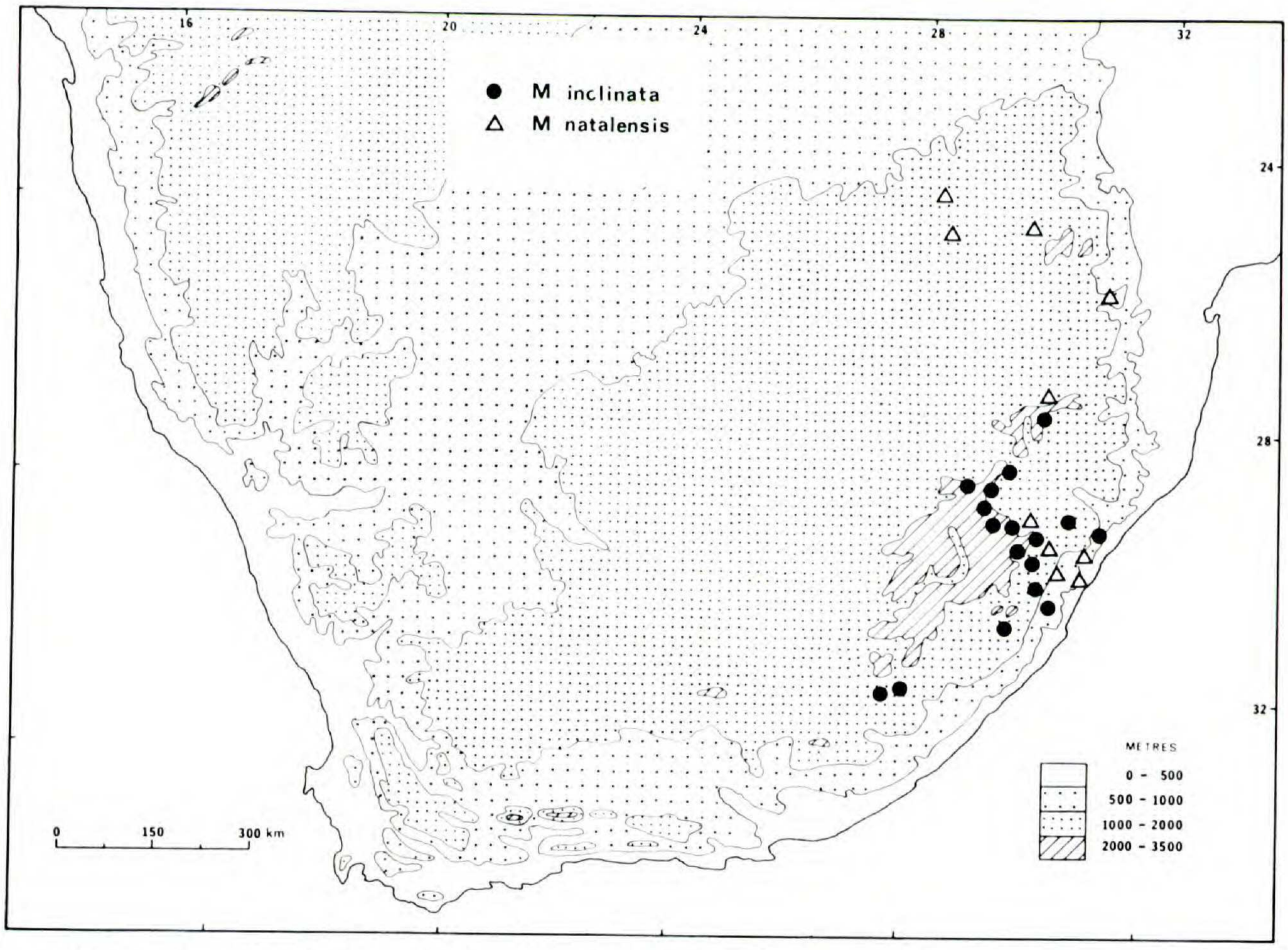

FIGURE 6. Distribution of *Moraea natalensis* and *M. inclinata*.

25.31 (Komatipoort): Barberton (-CC), *Pott 5461* (PRE).
27.30 (Vryheid): Oshoek, near vlei (-AC), *Mauve 4497* (PRE).
29.29 (Underberg): Estcourt Plant Research Station (-BB), *Acocks 10756* (PRE).
29.30 (Pietermaritzburg): Howick (-AC), *Rycroft 2067* (BOL); Lidgetton, *Mogg 770* (PRE); Richmond road (-CD), *Barker 4375* (BOL); Arnolds Hill, Richmond, *Wylie s. n.* (NH 23372); between Bisley and Richmond, *Almborn 846* (LD); Groenberg (-DB), *Wood 1072* (SAM, PRE); Umbilo (DD), *Wood 520* (BOL).

5. **Moraea inclinata** Goldbl., sp. nov. Type: Cathkin Park, *Galpin 11847* (BOL, holotype, PRE, isotype).—FIG. 3F.

Planta gracilis, ad 90 cm alta. *Cormus* 1–1.5 cm diam., tunicis atrobrunneis. *Prophylla* fibrosa. *Folium* insertum ad basem inflorescentiae, 15–40 cm longum, lineare, canaliculatum aut teres. *Folia vaginantia* 1–2 cm longa, pallida-brunnea. *Scapus* gracilis, glaber aut lanuginosus, plerumque inclinatus ad terram, simplex an pauciramosus. *Inflorescentia* 2.5–4 cm longa, spatha exterior brevior dimidio quam interior, brunnea aut viridis sole ad basem. *Flores* caerulei, lutea nota; *perianthii segmenta exteriora* 2.5–3 cm longa, 1 cm lata, limbi reflexi; *segmenta interiora* 2–2.5 cm longa, ad 6 mm lata, limbi reflexi. *Filamenta* connata ad basem, 5 mm longa, *antherae* circa 7 mm longae. *Stylus* ad 5 mm longus, rami 6 mm longi cristae ad 5 mm longae. *Germen* clavatum; capsula sphaerica, ad 6 mm diam. *Semina* angulata.

Plant fairly tall, 40–90 cm long including the leaf. *Corm* 1–1.5 cm in diameter, with tunics of brown fibres sometimes extending upwards in a neck. *Prophylls* covering the underground part of the stem. *Produced leaf* inserted high up on stem, just below the inflorescence, usually between 15–40 cm long, canaliculate, to 3 mm wide or terete with margins inrolled. *Scape* slender, glabrous or rarely woolly, usually leaning to one side, bearing a long leaf towards the apex, just

below the inflorescence; usually flexed and branched above the leaf and bearing to 4 flower clusters. *Bract leaves* 1–2 cm long sheathing the stem, with apex free, dry and light brown, or base only green. *Inflorescence* several flowered; 2.5–4 cm long and up to 4 mm thick, inner spathe with a membranous dry speckled margin and brown tip; outer spathe much shorter, rarely half the length of inner; dry, light brown or green at base only. *Flowers* blue with yellow nectar guide on outer petals; *outer perianth segments* 2.5–3 cm long and 1 cm wide at broadest point, both limb and claw fairly broad, limbs reflexed; *inner perianth segments* 2–2.5 cm long and up to 6 mm wide, limbs reflexed. *Filaments* connate at base, up to 5 mm long, anthers 7 mm long. *Style* branching about 5 mm from base, branches about 6 mm long and up to 3 mm wide, style crests up to 5 mm long. *Ovary* clavate, capsule spherical, up to 6 mm in diameter. *Seeds* angular.

Flowering time: Late spring to early summer.

Distribution: Slopes of the Drakensberg in Natal and the north eastern Cape (Fig. 6).

Icon: Trauseld, Wild Flowers of the Natal Drakensberg. 35, *fig. 162.* 1969.

Although *Moraea inclinata* is a quite distinct species, it has in the past been confused with *Moraea natalensis* which has a similar habit with the leaf inserted on the stem just below the inflorescence. An examination of large numbers of plants has indicated that two species are involved. *Moraea natalensis* is a smaller, more slender plant found in both the Transvaal and in Natal where its distribution borders on that of *M. inclinata* along the foothills of the Drakensberg. The two can easily be distinguished by the capsules, which are spherical in *M. inclinata* and ovoid in *M. natalensis.* The size of the spathe bracts and flowers are also quite distinct features.

27.30 (Vryheid): Zwartkop (-CB), *Wood 10233* (NH).
28.28 (Bethlehem): Mont aux Sources area (-DB), *Trauseld 162* (PRE); Tiger Cave Valley, *Evans 493* (NH).
28.29 (Harrismith): Near Oliviers Hoek (-CA), *Wood 3442* (NH); Cathedral Peak area (-CC), *Killick 1260* (NH).
28.30 (Dundee): Weenen district (-CC), *Wood s. n.* (BOL 30815).
29.29 (Underberg): Giants Castle Game Reserve (-AB), *Bruyns-Haylett 13* (NU); *Trauseld 977* (NU); *Symons 307* (PRE); Cathkin Park, Little Berg, *Galpin 11847* (BOL, PRE); Estcourt (-BB), *Plowes 2392* (NH, PRE); Ross, Umgeni Poort (-BD), *Moll 1427* (NU).
29.30 (Pietermaritzburg): Cleveland farm (-AC), *Smuts 1411* (PRE); Balgowan, *Moll 2854* (PRE); near Curry's Post, *Wood 3436* (NH); Greytown (-BA), *Wylie s. n.* (NH 21726); Dargle (-CA), *Hilliard and Burtt 3192* (NU); Mountain Glen, Dargle, *Taat 1317* (PRE); Liddesdale, *Wood 4255* (NH).
29.31 (Stanger): Ensikeni (-AC), *Haygarth sub Wood 12079* (BOL, NH).
30.29 (Kokstad): Weza-Ngeli slopes (-DA), *Strey 6279* (NH, NU, PRE).
30.30 (Port Shepstone): Ixopo district (-AA), *Shirley s. n.* (NU 32366); Dumisa near Ifafa (-AD), *Rudatis 432* (PRE).
31.27 (Lady Frere): Little Bush, Cala, *Pegler 1702* (LD); Kwenkwe Mountain, Maclear district (-DA), *H. Bolus 8714* (BOL); Engcobo mountains (-DB), *H. Bolus 10308* (BOL); *Flanagan 2661* (PRE, SAM).
Doubtful locality: Drakensberg summit, *Wood 3442* (BOL).

6. **Moraea stricta** Bak., Viert. Nat. Ges. Zürich 49: 178. 1904. Type: Shilouvane, Tvl. *Junod 563* (Z, holotype, K, LD, isotypes).

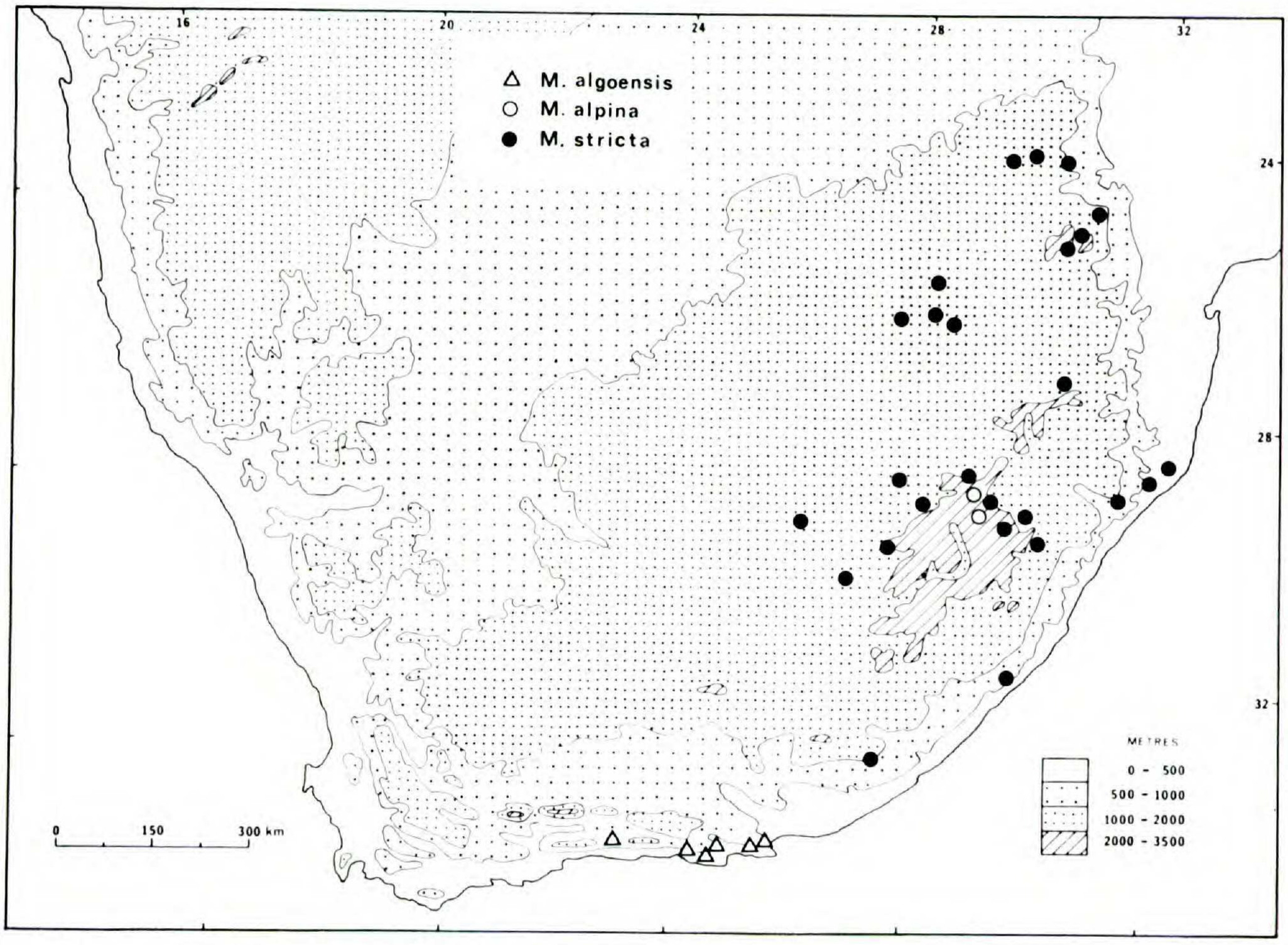

FIGURE 7. Distribution of *Moraea stricta*, *M. alpina*, and *M. algoensis*.

Moraea trita N. E. Br., Trans. Roy. Soc. S. Africa 17: 347. 1929. Type: Lydenburg, *Wilms 1419* (K, holotype, P, PRE, isotypes).

Moraea parva N. E. Br., Trans. Roy. Soc. S. Africa 17: 347. 1929. Type: Woodbush, *Moss 15564* (K, holotype).

Moraea mossii N. E. Br., Trans. Roy. Soc. S. Africa 17: 347. 1929. Type: Johannesburg, *Moss 15805* (K, holotype, PRE, isotype).

Plants small to medium, usually 15–25 cm high. *Corm* 1–3 cm in diameter, tunics of medium to coarse fibres, dark brown in color, often bearing cormlets among the fibres. *Basal leaf* usually absent at flowering time (or dead and still attached to base of scape), occasionally new leaf emerging; eventually produced to about 60 cm or more, about 1.5 mm thick, terete, without adaxial groove. *Sheathing leaves* brown, membranous, covering underground part of scape and new leaf. *Bract leaves* 3–6 cm long, dry, membranous, brown; apices often lacerated. *Scape* erect, usually bearing 3–6 branches; branches held close to main stem, on short peduncles or sessile. *Inflorescence* several flowered, 3–4 cm long; spathe bracts dry and papery, rarely green near the base, apices membranous, speckled darker brown, sometimes lacerated; inner bracts larger but almost equal in length to outer, sometimes shorter. *Flowers* pale lilac to mauve with yellow spotting on outer petals; *outer perianth segments* about 2 cm long, limb about 1 cm long and 4–7 mm wide, obovate to lanceolate, *inner perianth segments* slender, erect, about 1.5–1.8 cm long and 2–4 mm wide, linear-lanceolate. *Stamens* connate at base only, filaments about 3.5 mm long, anthers 5 mm long. *Style* branching about 1.5 mm from base, branches 7–8 mm long, crests lanceolate,

3 mm long. *Ovary* clavate; *capsule* 1 cm × 0.5 cm. *Seeds* small, yellow, angled. *Chromosome number*: $2n = 24$, *Goldblatt 155* (J).

Flowering time: July to November.

Distribution: Occurring in grasslands from the eastern Cape to the northern Transvaal (Fig. 7).

Icon: Letty, Wild Flowers of the Transvaal. *Pl. 36, fig. 1.* 1962.

Moraea stricta is a very distinct species and is easily recognised by the very characteristic lack of a green leaf at flowering time. The previous season's dead, dry leaf is sometimes attached to the flowering stem, and its presence often gives rise to confusion over identification, especially in the case of herbarium material. The branches hugging the main axis and the dry bracts are, however, also characteristic and should aid determination.

Moraea stricta has been known as *M. trita* since N. E. Brown described the latter species in 1929. An examination of the description and type of *M. stricta* Baker has, however, revealed that it is an earlier name for this plant. Two other species *M. parva* and *M. mossii* described by N. E. Brown also appear, to the present author, to be synonyms of *M. stricta*.

23.29 (Pietersburg): Pietersburg (-CD), *Wilkinson s. n.* (PRE 31516); near Haenertsburg (-DD), *Burtt-Davy s. n.* (BOL 4119); *Zeederberg s. n.* (PRE 4087).
23.30 (Tzaneen): Letaba (-CD), *Scheepers 1164* (PRE).
24.30 (Pilgrim's Rest): Near Belvedere (-DB), *Davidson 621* (J).
25.28 (Pretoria): Lynnwood (-CA), *Letty 381* (PRE).
25.30 (Lydenburg): Lydenburg (-AB), *Wilms 1419* (PRE); near Lydenburg (-BA), *Wilms 1418* (P).
26.27 (Potchefstroom): Krugersdorp (-BB), *Bush s. n.* (PRE 8171); Witpoortjie Kloof, *Moss 8013* (J).
26.28 (Johannesburg): Thorntree Kloof, *Moss 15956* (PRE); Johannesburg (-AA), *Moss 2877, 15805* (both PRE); Milner Park, Johannesburg, *Moss 18199* (PRE); Houghton Ridge, Johannesburg *Moss 2879* (PRE); Melville Koppies, *Goldblatt 155* (J); Benoni (-AB), *Bradfield 91* (PRE).
27.30 (Vryheid): Oshoek, Wakkerstroom district (-AC), *Devenish 1153* (PRE).
28.27 (Senekal): Strathcona, Ficksburg district, *Galpin s. n.* (BOL 30813); Moolmans Hoek Peak, *Galpin s. n.* (BOL 30814).
28.28 (Bethlehem): Leribe (-CC), *Dieterlen 324* (NH); Mont aux Sources (-DB), *Hutchinson, Forbes & Verdoorn 122* (NH, PRE).
28.29 (Harrismith): Cathedral Peak area (-CC), *Esterhuysen 12895* (BOL).
28.31 (Nkandla): Eshowe (-CD), *Lawn 911* (NH); *Gerstner s. n.* (NH 22960); Empangeni district (-DB), *Venter 1987* (NH).
28.32 (Mtubatuba): Lower Umfolosi area, *Hitchins 44* (NU, PRE).
29.26 (Bloemfontein): Bloemfontein (-AA), *Potts s. n.* (PRE 2867); Erasmus (-DD), *Repton 450* (PRE).
29.27 (Maseru): Roma (-BC), *Ruch 20* (PRE).
29.28 (Marakabei): Maletsunyani Falls (-CC), *Esterhuysen 13185* (BOL); M'weni area, *Esterhuysen 18686* (BOL).
29.29 (Underberg): Cathkin area (-AB), *Esterhuysen 7941* (BOL); Giants Castle Game Reserve, *Trauseld 1012* (NU, PRE); *Skead 173* (NU); near Mooi River (-BB), *Schlechter 3331* (BOL); Estcourt district *West 814* (PRE).
29.30 (Pietermaritzburg): Nottingham road (-AC), *Levett 6* (NH).
31.29 (Port St. Johns): Port St. Johns area (-DA), *Baker 9, 11* (PRE).
32.27 (Stutterheim): Stutterheim commonage (-CB), *Acocks 9125* (PRE).

7. **Moraea alpina** Goldbl., sp. nov. Type: Mont aux Sources, *Galpin 10361* (PRE, holotype).

Planta parva, 4–12 cm alta. *Cormus* circa 0.7 cm diam., tunicis fibris pallidis. *Prophylla* membranacea. *Folium basale* gracile teres, 0.5 mm diam., abscens aut emergens tempore florendi, si emergens nunc non insertum in caule florenti. *Folia vaginantia* sicca, membranacea, 5–15 mm longa. *Scapus* contractus, simplex aut pauciramosus. *Inflorescentia* pauciflora circa 2.5 cm longa, 3 mm lata, spatha viridis, marginibus hyalinis, interior quam exteriorem excedens 1 cm. *Flores* atrocaerulei aut violacei, lutea nota; *perianthii segmenta exteriora* ad 1.2 cm longa, 3–4 mm lata; *segmenta interiora* breviora, apicibus aliquot expansis. *Filamenta* connata ad basem, anthere 3 mm longae. *Stylus* ramosus prope basem, rami 6 mm longi, cristae 1.5 mm longae. *Germen* clavatum, capsula sphaerico-ovoidea, ad 5 mm longa. *Semina* angulata.

Plants very small, 4–12 cm high. *Corm* about 0.7 cm in diameter with tunics of fine, light brown fibres. *Prophylls* membranous, covering lower portion of leaf and scape. *Basal leaf* slender, terete, 0.5 mm in diameter, absent or emergent at time of flowering; not attached to flowering stem but to corm. *Bract leaves* dry and membranous, 5–15 mm long. *Scape* slender, few-branched or simple; contracted. *Inflorescence* several-flowered, about 2.5 cm long and 3 mm thick; spathes green, margin hyaline, inner exceeding outer by about 1 cm. *Flowers* dark blue to violet with yellow nectar guides; *outer perianth segments* about 1.2 cm long and 3–4 mm wide; *inner perianth segments* shorter than outer, somewhat expanded near apex. *Filaments* joined near base only, anthers 3 mm long, exceeding the stigmas. *Style* branched almost from base, branches 6 mm long, style crests 1.5 mm long. *Ovary* clavate; capsule spherical to ovoid, to 5 mm long. *Seeds* angular.

Flowering time: December.

Distribution: Summit plateau of the Drakensberg in Natal and Lesotho (Fig. 7).

Moraea alpina is a very poorly known species which, although collected only twice, seems quite distinct. Its most remarkable feature is its small size, which may account for its infrequent collection. The terete structure of the basal leaf and the fact that it is not attached to the flowering stem of the same season, indicate a relationship with *M. stricta*, a large spring flowering species which is leafless when in bloom. Other features such as the short length and thickness of the inflorescences, the rotund shape of the capsule and the length of bract leaves suggest it is not a diminutive, late flowering form of *M. stricta*, but a distinct species, though probably closely related to its postulated ally. It is of interest to note that *M. stricta* occurring in the same area of the Drakensberg flowers much earlier (September or October) even at high altitudes.

28.28 (Bethlehem): Beacon Buttress, summit (-DD), *Galpin 10367* (PRE).
28.29 (Harrismith): Cleft Peak area (-CC), *Killick & Marais 2182* (PRE).

8. **Moraea algoensis** Goldbl., sp. nov. Type: Port Elizabeth, *Batten 7* (NBG, holotype).—FIG. 3G.

Planta 20–30 cm alta. *Cormus* ad 1 cm diam. *Prophylla* membranacea. *Folium basale* lineare, canaliculatum, 2–3 mm latum, inflorescentiam excedens. *Folia vaginantia* ad 4 cm longa, sicca et brunnea supra, apicibus acutis. *Scapus* ramosus, rami 2–4, saepe secundi. *Inflorescentia* ad 5 cm longa, spatha exterior breviore prope dimidio, apicibus acutis, marginibus brunneis et membranaceis. *Flores* atrocaerulei, lutea nota; *perianthii segmenta exteriora* ad 2.6 cm longa; limbus ad 1.6 cm longus et ad 9 mm latus; *segmenta interiora* brunnea, breves, 6–10 mm longa; limbus expansus, ad 2.5 mm latus. *Filamenta* 4 mm longa, connata ad 3 mm, antherae circa 4 mm longae. *Stylus* 4 mm longus, rami 5 mm longi, cristae lineares, ad 8 mm longae. *Germen* clavatum, seminibus angulatis.

Plants 20–30 cm in height. *Corm* about 1 cm in diameter. *Prophylls* reaching to ground level. *Basal leaf* linear, inserted near ground level, canaliculate, 2–3 mm wide, terete when dry, exceeding the inflorescence. *Bract leaves* to 4 cm long, dry and brown in upper part with long tapering apex. *Scape* branched, branches 2–4 held away from axis, often all facing to one side. *Inflorescence* to 5 cm long, outer spathe about half length of inner; both spathe bracts with brown membranous margin and tapering apex. *Flowers* dark blue with yellow nectar guide; *outer perianth segments* to 2.6 cm long, limb about 1.6 cm long and about 0.9 cm broad; *inner perianth segments* brown, comparatively short, 6–10 mm long, reaching to about the level of the stigmas, distinctly unguiculate, limb expanded, ovate, to 2.5 mm broad. *Filaments* joined for 3 mm, filaments free for 1 mm, anthers about 4 mm, not reaching the stigmas. *Style* column about 4 mm, branches 5 mm, crest linear up to 8 mm long. *Ovary* clavate. *Seeds* angled.

Flowering time: July to September.

Distribution: Southern Cape in the Port Elizabeth–Humansdorp area (Fig. 7).

Icon: Batten and Bokelmann, Wild Flowers of the Eastern Cape Province. 27, *fig.* 7. 1966.

Moraea algoensis, which occurs on the borders of the summer and winter rainfall areas, appears to be distinct from its allies *M. elliotii* and *M. tripetala*. Its very characteristic feature is the inner perianth segment which is brown, and, although comparatively short, has a broad expanded limb. The species has, until now, been undescribed although it has been known for many years.

33.23 (Willowmore): Between Knysna and Avontuur (-CC), *Fries, Norlindh & Weimarck 1790* (SAM).

33.24 (Steytlerville): Assegaibosch (-CD), *Fourcade 1427* (BOL); 70 km W of Port Elizabeth (-DD), *Story 2834* (PRE).

33.25 (Port Elizabeth): Witteklip flats (-CC), *Holland s. n.* (BOL 30812); Port Elizabeth (-DC), *Hafstrom & Acocks s. n.* (PRE 31513); Redhouse *Paterson 439* (BOL); near Port Elizabeth, *West 311* (BOL); *Batten 7* (NBG).

34.24 (Humansdorp): Humansdorp (-BB), *Loubser 880* (NBG).

Group IV: Vieusseuxia

9. **Moraea pubiflora** N. E. Br., Trans. Roy. Soc. S. Africa 17: 348. 1929. Type: Hlatikulu, Swaziland, *Miss Stewart s. n.* (K, holotype, PRE, isotype).

Plants of medium height, seldom exceeding 60 cm. *Corm* to 2 cm in diameter, covered with tunics of dark brown netted fibres, sometimes forming a neck. *Prophyll* pale to dark brown, ribbed below. *Leaf* inserted near base, above ground level, linear canaliculate, about 4 mm wide and up to 60 cm long. *Bract leaves* 2–3, green, with dry brown apex, 5–8 cm long. *Scape*, usually branched, bearing to 10 branches, all held to one side, close to axis. *Inflorescence* several flowered, spathe bracts green, with dry apex, inner to 8 cm, outer about half the length of inner. *Flowers* white to pale blue or lilac; *outer perianth segments* to 3 cm long, limb about 1.5 cm long spreading, lanceolate, claw bearded on inner surface, scabrid or smooth on outer surface; *inner segments* trifid, green spotted with brown; outer lobes slender, 4–8 cm long, obtuse, erect; inner lobe linear,

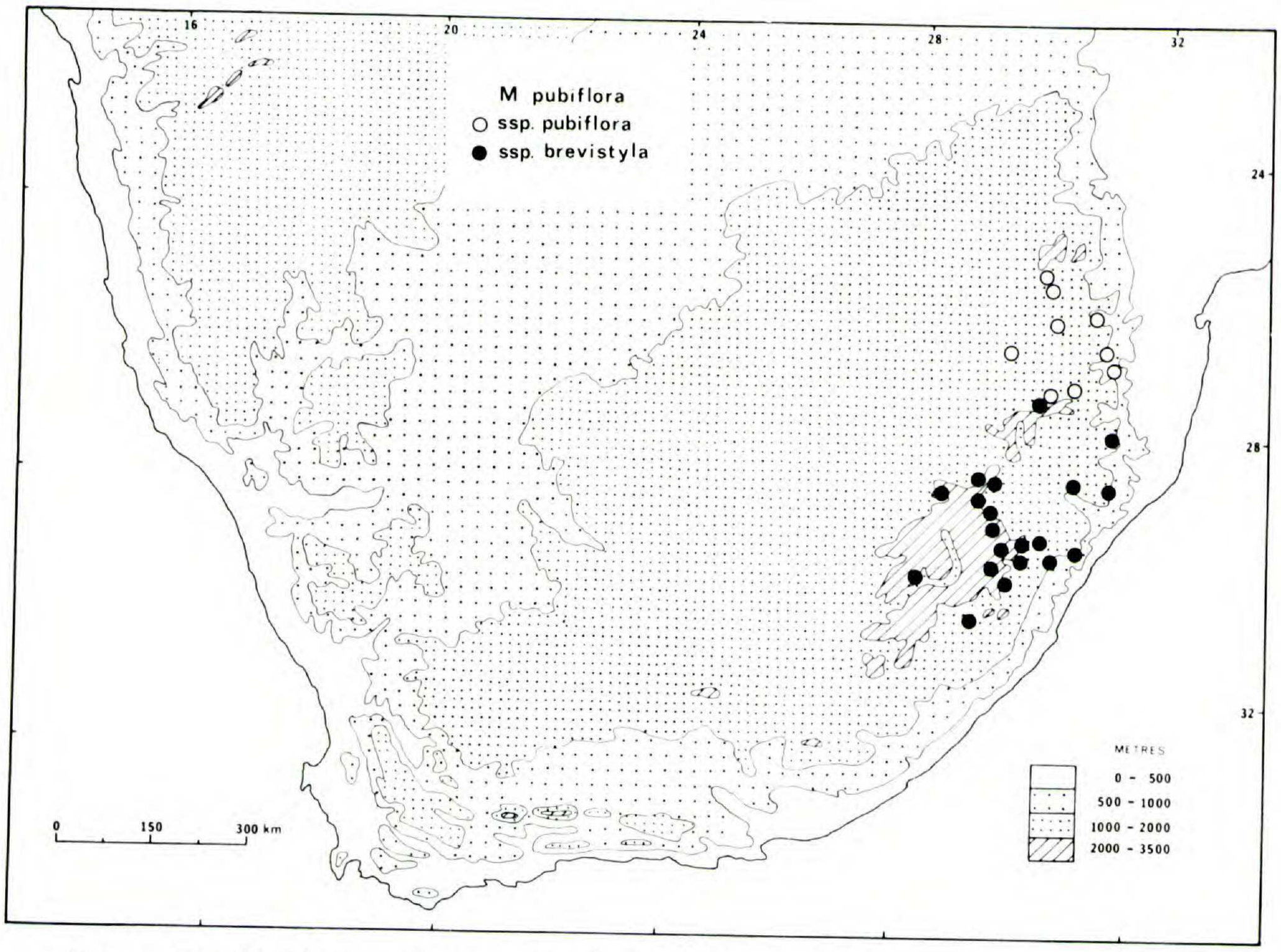

FIGURE 8. Distribution of *Moraea pubiflora* subsp. *pubiflora* and subsp. *brevistyla*.

acute, curving outwards, 4–8 cm long. *Filaments* to 1.5 cm long, free near apex only; *anthers* 4–6 mm long extending beyond the stigmas. *Style* to 1.5 cm long, branches 4 mm long, crests linear, 3–4 mm long. *Ovary* clavate; *capsule* barrel-shaped, to 1 cm long.

Flowering time: Summer.

Distribution: Grasslands in the eastern Cape to the south eastern Transvaal and Swaziland (Fig. 8).

Icon: Trauseld, Wild Flowers of the Natal Drakensberg. 37, *fig.* 325. 1969.

This species can easily be recognised by the peculiar structure of the inner perianth segments, which are divided into 3 subequal slender lobes, the outer two being expanded at the apex and obtuse, and the inner slender with an acute apex (Fig. 3D). Such a structure also occurs in some forms of *Moraea dracomontana*, an allied species from the Drakensberg. Here, however, the inner segments appear uniformly purple, while those of *M. pubiflora* are mottled brown and yellow. Other differences in size, branching habit, and habitat make it unlikely that these two be confused. The structure and flower color of *M. tenuis* from the winter rainfall area are remarkably similar to *M. pubiflora*, especially subsp. *brevistyla* and indicate a close relationship. *Moraea pubiflora* is treated as comprising two subspecies: the northern form with a robust habit, large flowers with a markedly scabrid outer surface on the claw of the outer petals and a long style and filament column; and the southern, with smaller flowers, little or no scabridity and a short style and filament column.

KEY TO THE SUBSPECIES

1. Filaments 1–1.2 cm long ..... 9a. subsp. *M. pubiflora*
1′. Filaments 0.5–0.7 cm long ..... 9b. subsp. *M. brevistyla*

9a. subsp. **pubiflora**

Plants generally more robust than in subsp. *brevistyla*, bearing 2 or 3 (rarely to 6) branches. *Flowers* large, with outer segments to 3 cm long; claw to 1.5 cm, outer surface markedly scabrid to pubescent. *Filaments* to 1.5 cm long. *Style* to 1.2 cm long, branches to 4 mm.

Distribution: South eastern Transvaal and Swaziland (Fig. 8).

This subspecies can easily be recognised by the length of the style and filament column which is about 1–1.2 cm long. In addition subsp. *pubiflora* usually bears fewer branches and has larger flowers which exhibit the unusual character of scabridity or pubescence on the outer surface of the outer perianth segments.

25.30 (Lydenburg): Dullstroom (-AC), *Noome 20798* (PRE); *Galpin s. n.* (BOL); Belfast (-CA), *Leendertz s. n.* (PRE 9168); *H. Bolus 12332* (BOL, PRE).

26.29 (Ermelo): Ermelo common (-DB), *Sisters of Ermelo Convent 17* (PRE).

26.31 (Mbabane): Forbes Reef (-AA), *Karsten s. n.* (BOL 57876, PRE 31515); Stroma, Mbabane (-C), *Compton 24830* (NBG); Mankaiana (-CA), *Compton 25311* (NBG, PRE); Hlatikulu (-CD), *Stewart s. n.* (K, PRE 9551); *Compton 26376* (NBG).

27.30 (Vryheid): Tafelkop, Wakkerstroom (-AC), *Mauve & Tolken 4528* (PRE); Mooi Hoek, near vlei (-BA), *Devenish 312* (PRE).

Doubtful locality: Stafford, Ermelo district, *du Plessis 101* (PRE); near Olifants River, *Schlechter 4023* (BOL).

9b. subsp. **brevistyla** Goldbl., subsp. nov. Type: Cathkin Park, *Galpin s. n.* (BOL 30823, holotype).—FIG. 3D.

Planta parvior quam subsp. *pubiflora*, et plerumque plus ramosa. *Flores* parviores; *perianthii segmenta exteriora* ad 2 cm longa, unguis ad 6 mm longus; pagina exterior laevis an pubescens. *Filamenta* ad 7 mm longa. *Stylus* 6 mm longus, rami ad 4 mm longi.

Plants smaller than subsp. *pubiflora*, and usually bearing more branches, about 5 being average. *Flowers* smaller, with outer segments to 2 cm long; claw to 6 mm, outer surface lightly pubescent or smooth. *Filaments* to 7 mm. *Style* 6 mm long, branches to 4 mm.

Distribution: Occurring in the southern part of the range for *M. pubiflora*, from northern Natal to the Transkei (Fig. 8).

This subspecies can almost always be easily distinguished from subsp. *pubiflora* by its short style and filaments, and also by the lack of scabridity or pubescence on the reverse surface of the outer perianth segments so typical of subsp. *pubiflora*. The distribution of the two subspecies overlaps to some extent in the Wakkerstroom area on the Natal–Transvaal border, and both have been recorded here. Occasionally both lengths of stigma occur in one collection (*Mauve & Tolken 4528*), which suggested to the present author that subspecies and not separate species were involved. The southern, short-styled form was, however, regarded as a distinct taxon as the abrupt variation in style and filament lengths cannot be regarded as a cline, and such a difference in the reproductive organs is undoubtedly significant.

27.30 (Vryheid): South Hill, Wakkerstroom (-AC), *Galpin 9885* (PRE); Oshoek, Wakkerstroom, *Devenish 234* (PRE); Wakkerstroom, *Beeton 96* (SAM).
27.31 (Louwsburg): Ceza, Mahlabatini district (-CD), *Hilliard & Burtt 3320* (NU).
28.28 (Bethlehem): Mont aux Sources (-DA), *Flanagan 2037* (BOL, PRE, SAM); *Flanagan 2014* (BOL).
28.29 (Harrismith): Grootvlei near Swinburne (-AC), *Jacobsz 2* (PRE); Rensburgskop (-AD), *Jacobsz 6A* (PRE); van Reenen, *Franks s. n.* (NH 12159); Oliviershoek (-CA), *Strey 9508* (NH, PRE); Cathedral Peak area (-CC), *Schelpe 5380* (NU); *Schelpe 1300* (NU); Cathedral Peak Forest Reserve (-CD), *Killick 1282* (PRE).
28.30 (Dundee): Qudeni (-DB), *Gerstner 640* (PRE).
28.31 (Nkandla): Melmoth (-CB), *Mogg 6240* (PRE).
29.28 (Marakabei): Simonkong, Maletsunyane (-CC), *Esterhuysen 13186* (BOL).
29.29 (Underberg): Giants Castle Game Reserve (-AB), *Trauseld 3250* (CPF, NU, PRE); Cathkin Park, *Galpin s. n.* (BOL 30823); *Edwards s. n.* (BOL 30822); Giants Castle Game Reserve, *McKeown 80* (NU); Champagne Castle Hotel, *Acocks 10112* (NH); Highmoor Forestry Estate (-BC), *Smith 15* (NU); Nottingham Road (-BD), *Schweickerdt 1317* (PRE); Drayton *Smith 182* (NU); Umkomanza River valley (-CB), *Marais 1438* (PRE); Loteni Nature Reserve (-DA), *Killick 3849* (NH); Mahraqua mountains (-DC), *Evans 233* (NH).
29.30 (Pietermaritzburg): Ehlatini farm, Karkloof (-AC), *Moll 3484* (NH, PRE); Zwartkop (-CB), *Wood s. n.* (NH 11398); Inanda (-DB), *Wood 414* (NH); *Wood 1116* (NH, SAM).
30.29 (Kokstad): Mount Currie (-AD), *Edwards 950* (NU).

10. **Moraea albicuspa** Goldbl., sp. nov. Type: Source of the Tina River, summit of Drakensberg, *Galpin 6846* (BOL, holotype, PRE, SAM, isotypes).

Planta ad 60 cm alta. *Cormus* ad 2 cm diam., tunicis fibris brunneis. *Prophylla* brunnea, fracta irregulariter aut fibrosa. *Folium* canaliculatum, lineare, ad 40 cm longum. *Folia vaginantia* 3–4, 4–6 cm longa, virides, apicibus brunneis membranacea. *Scapus* erectus plerumque ramos 1–2 ferens. *Inflorescentia* 5–7 cm longa, spatha interior aliquantum longior exteriore. *Flores* albi-cremei, genu segmentarum exteriorum atromaculato; *perianthii segmenta exteriora* 3–3.5 cm longa, limbus 1.5–2 cm longus et ad 1.5 cm latus; *segmenta interiora* 5–7 mm longa, lineares, acuta. *Filamenta* ad 7 mm longa, libra sole ad apicem; *antherae* 5–6 mm longae, albae. *Stylus* ad 7 mm longus, rami 7 mm longi, cristae graciles, ad 8 mm longae. *Germen* cylindrico-clavatum.

Plants medium in size, to 60 cm high. *Corm* to 2 cm in diameter, covered with tunics of brown fibres and decayed remains of old leaves extending upward in a neck. *Prophylls* brown, irregularly broken and somewhat fibrous. *Leaf* canaliculate, linear, to 40 cm long, apex usually dry and decayed. *Bract leaves* 3–4, sheathing, green with dry brown apex, 4–6 cm long. *Scape* erect, usually bearing 1–2 branches. *Inflorescence* several flowered, spathe bracts green with brown apex, inner spathe 5–7 cm long, outer somewhat shorter. *Flowers* white to cream, darkly spotted at base of limbs of outer segments; *outer perianth segments* 3–3.5 cm long, limb 1.5–2 cm long and about 1.5 cm wide, claw speckled darkly, glabrous; *inner perianth segments* reduced to minute, entire or slightly 3 lobed, 5–7 mm long, acute. *Filaments* about 7 mm long, free only at apex; *anthers* 5–6 mm, white, not reaching stigmas. *Style* white, about 7 mm long, branches to 7 mm, crests slender, to 8 mm. *Ovary* cylindrical to clavate.

Flowering time: January to March.

Distribution: Southern Drakensberg from Giant's Castle to Engcobo (Fig. 9).

Although this species has been known to science since the 1890's when it was found by H. Bolus in East Griqualand, it has remained undescribed. It is quite unlike any other species of *Moraea*, although perhaps is most closely related to *M. pubiflora*. The reduced size of the inner perianth segments with their almost

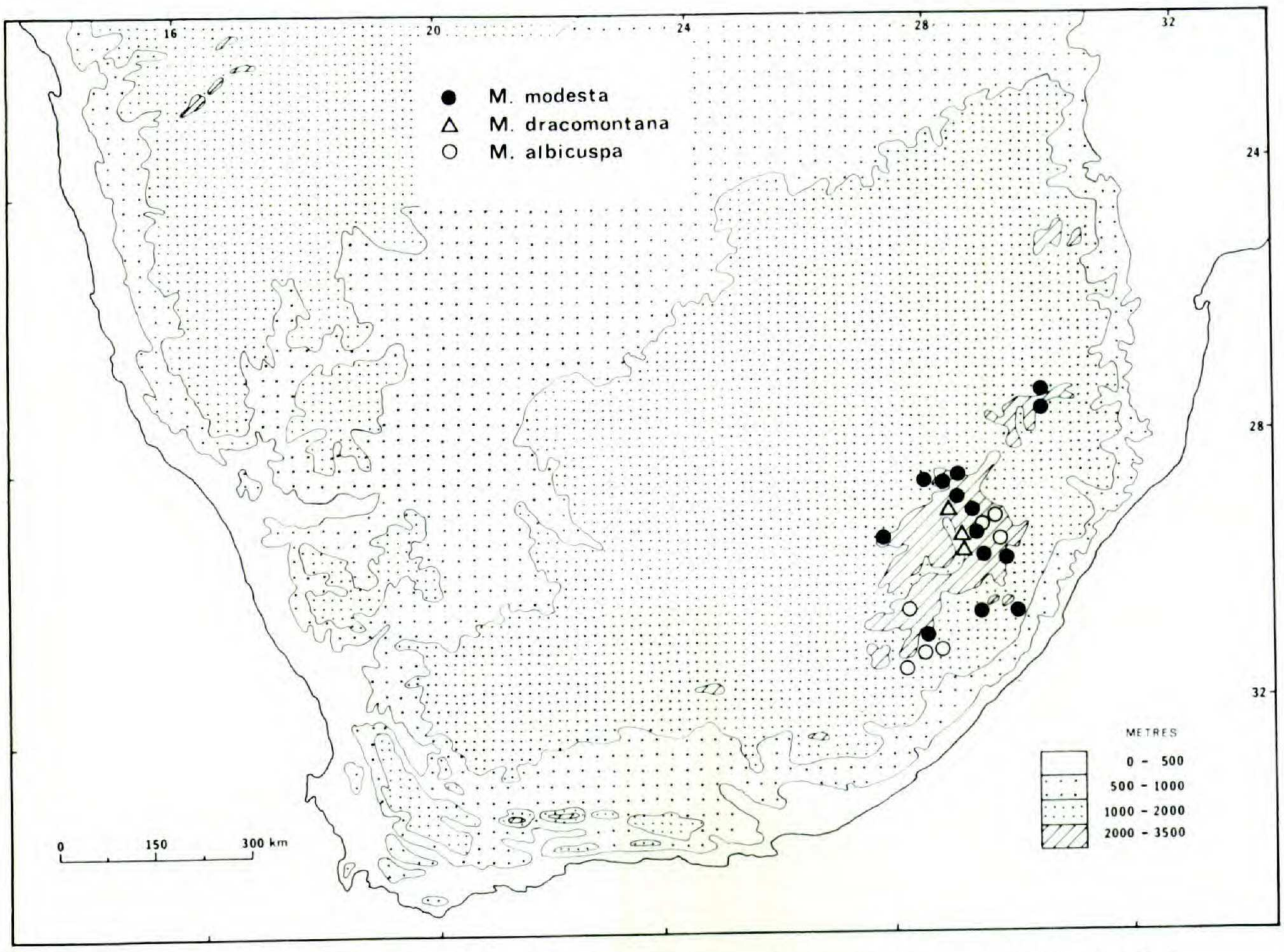

FIGURE 9. Distribution of *Moraea albicuspa*, *M. dracomontana*, and *M. modesta*.

or entirely absent lobing makes it easily recognisable and it is unlikely that it could be confused with any other species.

29.29 (Underberg): Bannerman Pass (-AB), *Trauseld 556* (NU, PRE); Giants Castle Game Reserve (-AD), *Trauseld 955* (PRE); top of Sani Pass (-CB), *Ruch 2443* (PRE, ROML).

30.28 (Matatiele): Drakensberg summit, Tina River (-AC), *Galpin 6846* (BOL, PRE, SAM).

31.28 (Umtata): Near Maclear (-AB), *H. Bolus 10307* (BOL); Ntywenka (-BA), *Hilliard & Burtt 3747* (NU); Engcobo mountain (-CA) *H. Bolus 10306* (BOL).

11. **Moraea dracomontana** Goldbl., sp. nov. Type: Langabalela Pass, Giant's Castle, *Trauseld 500* (PRE, holotype, CPF, NU, isotypes).

Planta ad 30 cm alta. *Cormus* ad 1 cm diam., munitus tunicis pallidis brunneis fibrosis. *Prophylla* membranacea, scapum vaginantia, saepe fracta et fibrosa. *Folium* teres an subteres, saepe siccum ad apicem. *Scapus* gracilis, erectus, raro ramosus. *Folia vaginantia* 2, ad 5 cm longa, virides, apicibus brunneis. *Inflorescentia* pauciflora, spatha interiora ad 5 cm longa, exteriore minori prope dimidio. *Flores* malvino-purpurei, luteo notata; *perianthii segmenta exteriora* 2.5–3 cm longa, limbus ad 1.8 cm longus; *segmenta interiora* 5–10 mm longa, trifida, cuspo medio acuto, longiore an breviore quam lateralibus, lobis lateralibus linearibus, apicis expansis, obtusis. *Filamenta* ad 6 mm longa, connata ad dimidium longitudinis; *antherae* 6 mm longae, malvinae. *Stylus* connatus sole ad basem, rami ad 8 mm longi, cristae lanceolatae, ad 6 mm longae. *Germen* cylindrico-clavatum.

Plants small, reaching to 30 cm high. *Corm* about 1 cm in diameter covered with tunics of fine light brown fibres and decayed leaves and prophylls extending upwards in a neck. *Prophylls* brown, irregularly broken, extending well above ground. *Leaf* sub-terete, with adaxial groove, about as long as stem, often broken

above. *Bract leaves* 2, entirely sheathing, 3–4.5 cm long, green with brown apex. *Scape* erect, rarely branched. *Inflorescence* several-flowered, spathe bracts green, with dry, brown apex, inner spathe about 5 cm long, outer a little more than half this length. *Flowers* mauve-purple with a yellow nectar guide; *outer perianth segments* 2.5–3 cm long, limb to 1.8 cm long; *inner segments* 5–10 mm long, trifid, outer lobes linear with expanded apex, obtuse, inner cusp slender, acute, either shorter or longer than the lateral lobes. *Filaments* to 6 mm, joined in lower half; *anthers* 6 mm long, mauve, not reaching the stigmas. *Style* joined at base only, branches about 8 mm long, crests lanceolate, to 6 mm long. *Ovary* cylindrical-clavate.

Flowering time: December to January.

Distribution: Drankensberg, high altitudes (Fig. 9).

Moraea dracomontana is known from only three collections, and it is clear that this species is far from being satisfactorily understood. Although all too little is known of its distribution or variation, it has the appearance of a distinct species. It is allied to *M. pubiflora* and *M. modesta* but seems intermediate between the two. The characteristic three-lobed inner perianth segments and the purple color of the flowers make *M. dracomontana* easy to distinguish.

28.28 (Bethlehem): Ox Bow camp (-DB), *Jacot-Guillarmod 4154* (PRE).
29.29 (Underberg): Langabalela Pass (-AD), *Trauseld 500* (CPF, NU, PRE); Sani Pass (-CB), *Hilliard 950* (NU).

12. **Moraea modesta** Killick, Bothalia 6: 437. 1954. Type: Cathedral Peak Forest Station, *Killick 1028* (PRE, holotype).

Plants small, 10–20 cm high, rarely more. *Corm* to 1 cm diameter covered with tunics of very fine fibres and old leaf bases which extend upwards in a neck. *Prophyll* membranous, sheathing base of stem, often broken and fibrous. *Leaf* terete, with adaxial groove; the leaf attached to flowering stem often dead and dry, sometimes absent, and a new leaf may be present but not fully developed at time of flowering. *Stem* slender, erect, rarely branched. *Bract leaves* 2 or rarely 3, to 5 cm long, sheathing, green, with dry, brown apex. *Inflorescence* few-flowered, spathes green, inner 3–5 cm long, outer two-thirds as long. *Flower* white to pale mauve, veined with purple; *outer perianth segments* 2–2.7 cm long, limb to 1.5 cm long and 1.5 cm wide; *inner segments* minute, to 6 mm long, linear or trifid with inner cusp longest, about 1 mm. *Filaments* to 6 mm long, free near apex only, anthers about 6 mm long. *Style* to 4 mm long, branches about 7 mm long, narrow, crests linear, about 6 mm long. *Ovary* cylindrico-clavate, to 8 mm long.

Flowering time: Spring to early summer.

Distribution: Drakensberg from Kokstad to Wakkerstroom, 1,800–3,000 m (Fig. 9).

Icones: Killick, Bothalia 6: 438. 1954; Trauseld, Wild Flowers of the Natal Drakensberg. 35, *fig. 299*. 1969.

This small plant was first described by Dr. D. J. B. Killick in 1954, who reported that it occurred on grass slopes in the Drakensberg at altitudes of between

2,000 and 3,000 m. More material, since examined, confirms this observation in general, although it is now known to occur over a wider range, from Kokstad in the south to Wakkerstroom in the north and including the whole of Lesotho. It has also been recorded from somewhat lower altitudes of about 1,800 m.

Moraea modesta is a small member of the group *Vieusseuxia*, and it is quite distinct from other members of this group. Its closest ally is perhaps *M. dracomontana*, but the terete leaf, often dead at flowering time, and the small, pale colored flower are good distinguishing characters which make it unlikely that *M. modesta* would be confused with other species.

27.30 (Vryheid): Oshoek, Wakkerstroom district (-AC), *Devenish 104, 1370* (PRE); Donkerhoek, Utrecht district (-AD), *Devenish 697* (PRE).

28.28 (Bethlehem): Leribe district (-C), *Dieterlen 813* (PRE); Golden Gate Park (-DA), *Liebenberg 7327* (PRE); Mont aux Sources (-DB), *Galpin 10372* (PRE); summit of Mont aux Sources (-DD), *Flanagan 2041* (BOL).

28.29 (Harrismith): Cathedral Peak area (-CC), *Killick 1028* (PRE); near Castle Butress, *Killick 1854* (BOL); Cathedral Peak Forest Station (-CD), *Killick 1551 A & B* (PRE).

29.27 (Maseru): Thaba Bosiu district (-BC), *Dieterlen 1064* (PRE).

29.29 (Underberg): Giants Castle Game Reserve (-AD), *Trauseld 406* (CPF, NU, PRE); *Trauseld 299* (CPF, NU); *Edwards 2168* (NU); *Skead 212* (CPF, NU); Giants Castle, *Wylie s. n.* (NH 10566); Umgeni Poort (-BD), *Moll & Mauve 2240* (PRE); Impendhle (-DB), *Levett 55* (NH).

30.28 (Matatiele): 25 km S of Mount Fletcher (-CD), *Killick & Marais 2075* (PRE).

30.29 (Kokstad): Mount Currie (-AD), *McLoughlin s. n.* (PRE 26266).

30.30 (Port Shepstone): Highflats, Polela district (-AC), *Lansdell s. n.* (NH 37539).

13. **Moraea trifida** Foster, Contr. Gray Herb. 114: 49. 1936. Type: As for *M. rogersii* N. E. Br.—Fig. 3C.

Moraea rogersii N. E. Br., Trans. Roy. Soc. S. Africa 17: 348. 1929, *non* Baker (1892). Type: Pilgrims Rest, *Rogers s. n.* (K, holotype).

Moraea culmea Killick, Bothalia 6: 436. 1954. Type: Cathedral Peak, *Killick 1558* (PRE, holotype, BOL, K, LD, NBG, NU, P, isotypes).

Plants small to medium, sometimes to 55 cm high. *Corm* 1–2 cm in diameter, with tunics of straw-colored fibres. *Prophylls* pale brown, reaching shortly above the ground. *Leaf* produced from stem some distance above ground; varying in degree of development when flowering; canaliculate, to 4 mm wide, to 60 cm long. *Bract leaves* 1 or 2 (–3), herbaceous with brown dry apex, 5–6 cm long. *Scape* erect, simple or several branched, branches erect. *Inflorescence* several flowered, spathes green, brown tipped, 3.5–7 cm long, outer spathe 1–2 cm shorter. *Flowers* yellow to cream, dotted brown to green; *outer perianth segments* spreading, reflexed at knee, lanceolate, 1.5–2 cm long, limb 0.8–1.0 cm long and 5–10 mm wide; *inner segments* to 1.5 cm high, erect, trifid; outer lobes short, ovoid, inner a long slender erect cusp to 7 mm long. *Filaments* to 9 mm long, free for last 1.5 mm, *anthers* to 4 mm long, often extending beyond the stigma in old flowers. *Style* to 7 mm long, branches about 4 mm long, crests slender to 4 mm long. *Ovary* clavate, 7–0 mm long; *capsule* barrel-shaped, to 2 cm long, about 0.5 cm wide.

Flowering time: Late spring to autumn—November to March, rarely later.

Distribution: Grassland from eastern Cape to south eastern Transvaal (Fig. 10).

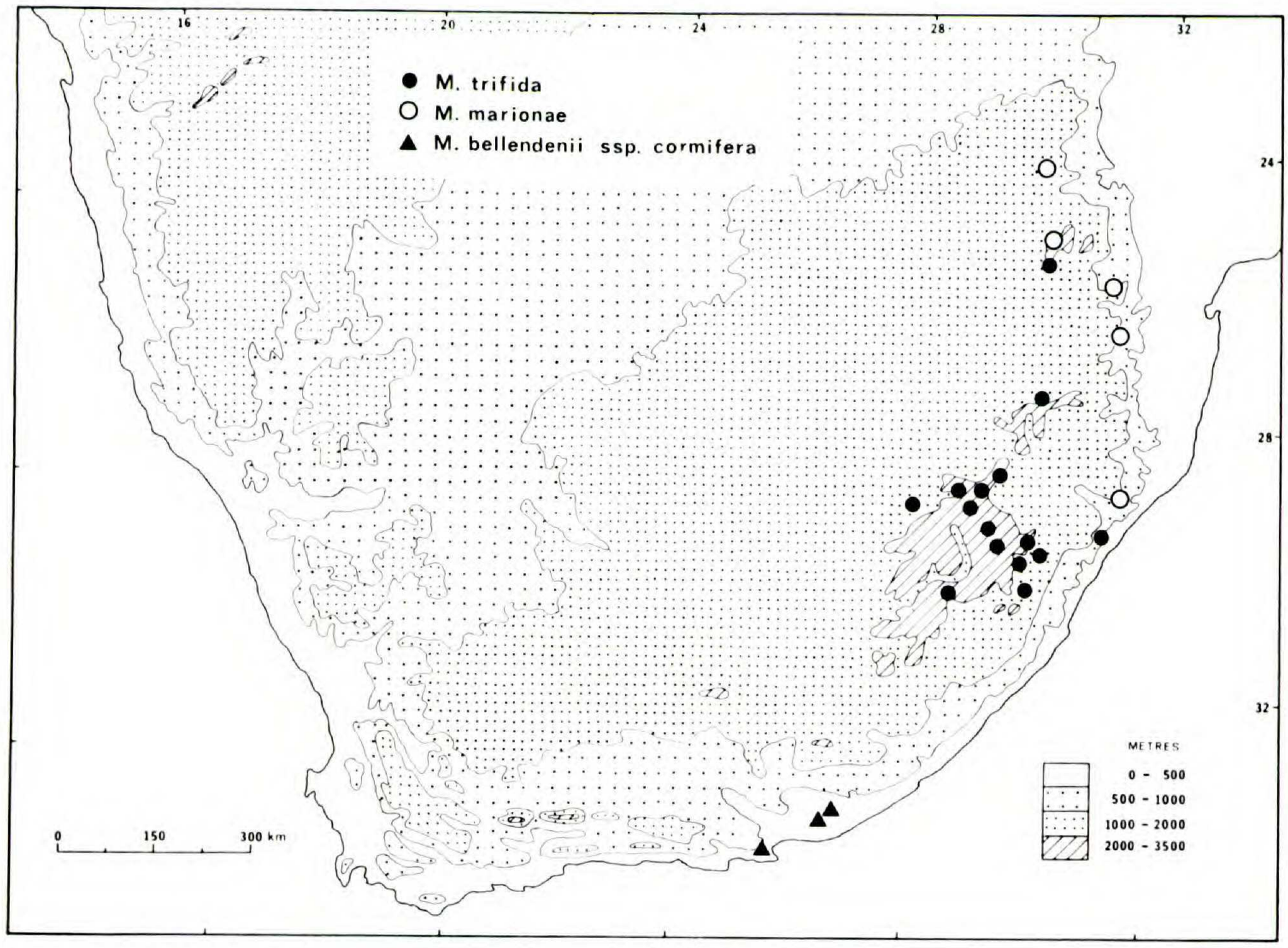

FIGURE 10. Distribution of *Moraea trifida*, *M. marionae*, and *M. bellendenii* subsp. *cormifera*.

Icones: Killick, Bothalia 6: 436. 1954; Trauseld, Wild Flowers of the Natal Drakensberg. 35, *fig. 474*. 1969.

This species was first described by N. E. Brown as *Moraea rogersii*, but this name was unfortunately a later homonym, having already been used by Baker. Foster renamed the plant, which is now known as *M. trifida*.

Moraea culmea, described by Dr. Killick, is reduced to synonymy here. An examination of the type collections of *M. culmea* and *M. trifida* (*M. rogersii*) reveals that there are very few differences and the flower structure is identical. *Moraea culmea* is smaller and has only a single bract leaf, while the taller, more robust *M. trifida* has two bract leaves. The features of size and number of bract leaves were studied in detail and found to have no significance. In general, early flowering plants are smaller, have a short leaf, and have one bract leaf, while the later flowering plants are taller, have a longer leaf, and have two or even three bract leaves. In spite of this loose correlation, some plants from the same collection may have one or two bract leaves and vary considerably in height and in length of the produced leaf.

25.30 (Lydenburg): Dullstroom (-AC), *Noome s. n.* (PRE 20797).
27.30 (Vryheid): Naauwhoek, Utrecht district (-AC), *Devenish 1256* (PRE).
28.27 (Senekal): Ficksburg (-DD), *Fawkes s. n.* (NBG 58945).
28.28 (Bethlehem): Tugela valley, Royal Natal National Park (-DA), *Hafstrom & Acocks 326* (PRE); Bestersvlei (-DB), *Flanagan 2044* (PRE); *H. Bolus 8255* (BOL).
28.29 (Harrismith): Van Reenen (-AD), *Wood 11410, 5608* (NH); Van Reenens Pass,

Marais 334 (PRE); Cathedral Peak Forest Reserve (-CA), *Killick 1558* (BOL, LD, NU, PRE, NBG), *1209* (PRE).

29.29 (Underberg): Mokhotlong district (-A), *Jacot-Guillarmod 1165* (PRE); Phutha (-AA), *Compton 21572* (NBG); Giants Castle (-AD), *Symons 445, 168* (PRE); Giants Castle Game Reserve, *Trauseld 474* (CPF, NU, PRE); Nottingham Road (-BD), *Franks s. n.* (BOL 30821, PRE 31499); Ross, Umgeni Poort, *Moll 1415* (NU); Impendhle (-DB), *Huntley 442* (PRE).

29.30 (Pietermaritzburg): Liddesdale (-CA), *Wood 4252* (NH).

29.31 (Stanger): Ensikeni (-AC), *Haygarth s. n.* (NH 12059).

30.28 (Matatiele): Quachas Nek (-BA), *Fawkes s. n.* (SAM 5425).

30.29 (Kokstad): Maxwell, Ixopo (-BB), *Evans 275* (NH).

14. **Moraea marionae** N. E. Br., Trans. Roy. Soc. S. Africa 17: 347. 1929. Type: Woodbush, *Miss Blenkison sub Moss 15565* (K, holotype).

Moraea exilis N. E. Br., Trans. Roy. Soc. S. Africa 17: 348. 1929. Type: Saddleback, Barberton, *Galpin 467* (K, holotype, PRE, isotype).

Plants small, rarely reaching 30 cm in height. *Corm* about 1 cm in diameter, covered with a tunic of pale straw-colored fibres which sometimes extend upwards in a neck. *Prophylls* short, pale, sheathing base of scape. *Leaf* solitary, absent in flowering specimens, presumably produced after flowering. *Bract leaves* usually two, lower produced very near ground, entire sheathing, herbaceous with dry brown apex, 2.4–4.5 cm long. *Scape* erect, slender, simple. *Inflorescence* several flowered, spathe bracts herbaceous with brown apex, inner to 5 cm long, outer about two-thirds as long. *Flowers* white to pale blue, marked with lilac veins; *outer perianth segments* 1.5–2 cm long, limb longer than claw, lanceolate; *inner segments* 1–1.2 cm long, erect, three lobed, outer lobes short, ovoid; inner forming a long slender cusp. *Filaments* about 5 mm long, joined for most of the length; *anthers* to 4 mm long, extending shortly above stigmas in older flowers. *Style* joined at base, branches about 4 mm long, crests slender, to 3 mm long. *Ovary* clavate; *capsule* barrel shaped, to 1 cm long.

Flowering time: August to October.

Distribution: Grassland, Zululand to Haenertsburg (Fig. 10).

As treated here, *Moraea marionae* and *M. exilis*, both described by N. E. Brown in 1929, are regarded as conspecific. No differences of any significance can be detected between the two, although *M. marionae* was recorded from Haenertsburg, while *M. exilis* was found at Barberton. It was decided to recognise *M. marionae* and reduce *M. exilis* to synonymy, because the description of the former species was more detailed and the type material is in better condition and is thus less liable to cause confusion. The type collection is in the Kew Herbarium and consists of 5 short flowering stems, one with a corm. A second collection apparently collected by Moss is fruiting material from the type locality and specimens of this later collection are to be found both at Kew and at the National Herbarium, Pretoria. *Moraea marionae* is undoubtedly closely allied to *M. trifida*, both species having the same floral structure, and they differ mainly in the presence or absence of a leaf at flowering time. Further study and if possible, cultivation, are needed to determine whether the two species are in fact distinct. It is unfortunate that *M. marionae* is poorly collected, but it is obviously a small, inconspicuous plant and thus could easily be overlooked.

One point not yet known about it is the nature of the leaf. All specimens collected lack a leaf at the flowering time, and it is not known whether this is a consistent feature, similar to that found in *M. stricta*. It is possible that *M. marionae* is simply a very early flowering form of *M. trifida*, but small differences in size and flower color support the contention that *M. marionae* is distinct.

23.29 (Pietersburg): Woodbush mountains (-DD), *Moss 15565* (PRE).
25.30 (Lydenburg): Steenkampsberg (-AA), *Codd 9833* (PRE); Mount Anderson (-BA), *Humbert 10957* (P).
25.31 (Komatipoort): Saddleback Ridge (-CC), *Galpin 467* (PRE).
28.31 (Nkandla): Eshowe (-CD), *Lawn 999* (NH); *Galpin 13539* (PRE).
Unknown locality: Swaziland, *Stewart s. n.* (PRE 10563).

15. **Moraea bellendenii** subsp. **cormifera** Goldbl., subsp. nov. Type: Atherstone area, Albany district, *Jacot-Guillarmod 6706* (RUH, holotype, GRA, isotype).

Planta ad 40 cm alta. *Folium basale* canaliculatum, 5 mm latum, axilla cormifera. *Scapus* simplex an pauciramosus. *Flores* lutei aut cremei, brunneo et auro punctato: *perianthii segmenta exteriora* ad 2.5 cm longa, circa 1.5 cm lata: *segmenta interiora* trifida, lobus interior gracilis, acutus, incurvus et spiralis.

Plants comparatively small, seldom exceeding 35 cm. *Corm* to 1.4 cm in diameter with tunics of fine straw-colored fibres. *Basal leaf* linear, canaliculate, to 5 mm wide, usually bearing a large cormlet in the axil. *Stem* simple or few-branched. *Inflorescence* 3–6 cm long, spathes herbaceous with brown acuminate apices. *Flowers* yellow to cream, spotted brown to gold; *outer perianth segments* about 2.5 cm long and 1.5 cm wide, limb comparatively wide; inner segments trifid, inner lobe cusp-like, incurved or spirally coiled. *Filaments* united to base of anthers. *Style* branches about 4 mm long, crests lanceolate. *Ovary* clavate, capsule to 12 cm long and 5 mm wide. *Seeds* angled.

Flowering time: October.

Distribution: Recorded from the Grahamstown and Port Elizabeth districts (Fig. 10).

This subspecies of *Moraea bellendenii* can be distinguished by its smaller size, fewer branches and the unusual character of the large cormlet in the axil of the basal leaf. Subspecies *cormifera* does not appear to be common and is not well known in its habitat. Typical *Moraea bellendenii* is a common late spring-flowering species in the western Cape, but it has been recorded as far east as Knysna and Humansdorp. Forms at the eastern extremity of the range are quite typical, robust, tall plants (45–100 cm), with many branches and do not have a large axillary cormlet characteristic of subsp. *cormifera*. The new subspecies, known from Port Elizabeth and east to Grahamstown, is not isolated from the typical subspecies by any great distance, and later collections in the intervening area may yield intermediates, but in their absence, it seems advisable to consider the eastern Cape form of *M. bellendenii* a distinct subspecies.

33.25 (Port Elizabeth): Baakens River valley (-DC), *F. Cruden 399* (GRA).
33.26 (Grahamstown): Atherstone area (-BC), *Jacot-Guillarmod 6706* (GRA, RUH); Grahamstown brickfields, *Misses Daly and Cherry 41* (GRA); *Dyer 1661* (GRA).

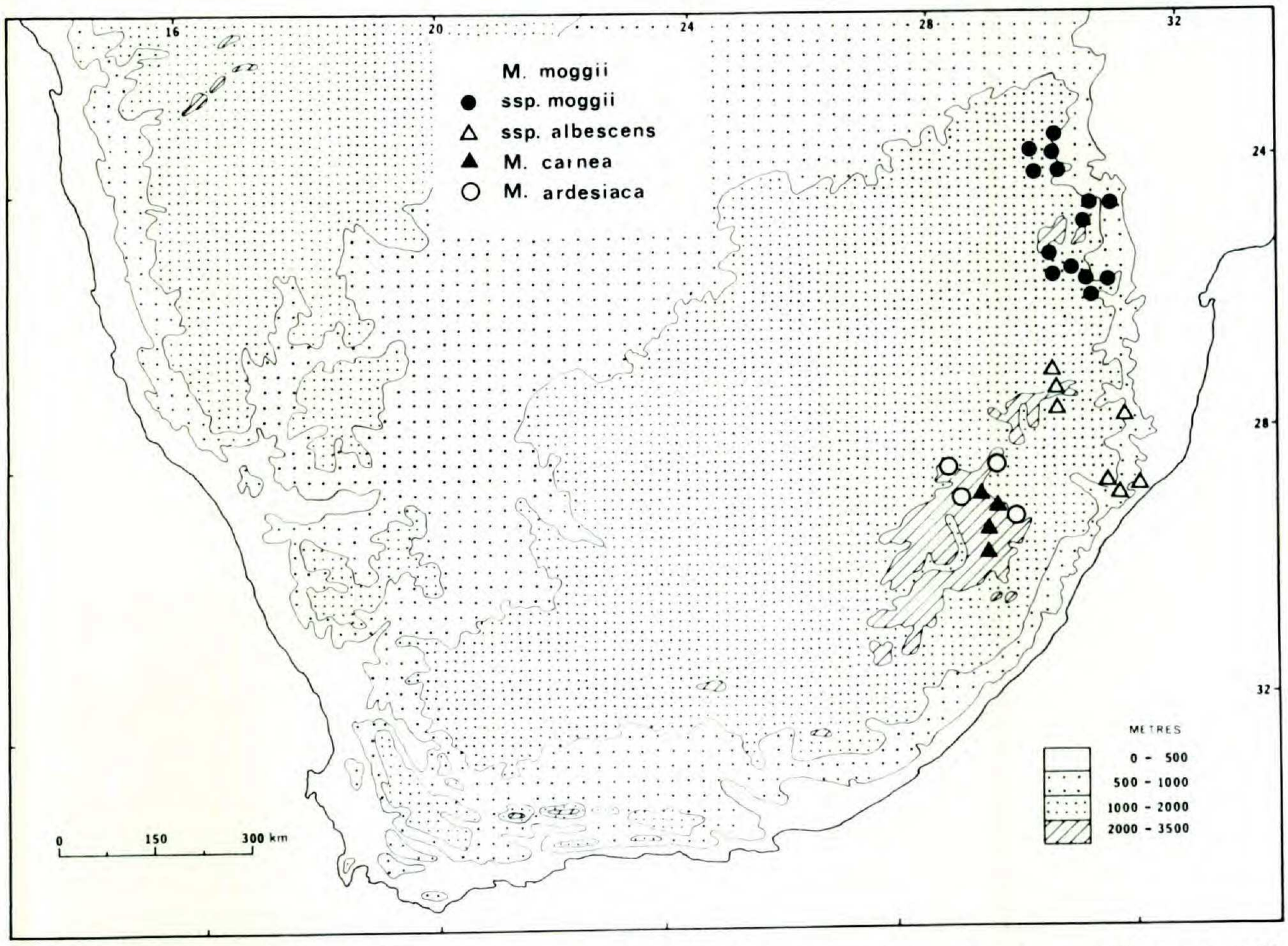

FIGURE 11. Distribution of *Moraea moggii* subsp. *moggii* and subsp. *albescens*, *M. carnea*, and *M. ardesiaca*.

Group V: GRANDIFLORA

16. **Moraea moggii** N. E. Br., Trans. Roy. Soc. S. Africa 17: 346. 1929. Type: Struben's farm, *Mogg s. n.* (PRE 15652, holotype).

Plants medium to tall, usually slender, to 70 cm high, always solitary. *Corm* to 2 cm in diameter, frequently covered by matted fibres of previous season's decayed leaf bases. *Prophylls* brown, purplish below, firm, entire or irregularly broken, not forming a fibrous network above. *Basal leaf* linear, canaliculate, exceeding inflorescence, to 1.5 cm wide. *Scape* erect, simple. *Bract leaves* (2–)3(–4), herbaceous, with dry brown apex, generally not overlapping. *Inflorescence* several flowered, 9–16 cm long, inner spathe slightly shorter. *Flowers* yellow, cream or white, with bright yellow nectar guide, and purple veined; *outer perianth segments*, broadly lanceolate, obtuse, 4–7.5 cm long, limb to 5 cm long and to 3.5 cm wide; *inner perianth segments* erect, broadly lanceolate with tapering base, obtuse to retuse, to 6 cm long and 2–2.5 cm wide. *Filaments* about 1 cm long, joined for about half their length; anthers about 1 cm long, not reaching the stigma. *Style* about 8 mm long, branches to 2 cm long, crests 1–2 cm long. *Ovary* linear 2–3 cm long; *capsule* to 4 cm long; *seeds* depressed, disciform. *Chromosome number* (subsp. *moggii*) $2n = 12$, *Goldblatt 86* (J).

Flowering time: December to May.

Distribution: Grassland, from Haenertsburg, northern Transvaal to northern Natal and Zululand (Fig. 11).

Icones: Sealy, Bot. Mag., n. s. *Tab. 469.* 1965; Letty, Wild Flowers of the Transvaal. *Pl. 36, fig. 2.* 1962. (Both are subsp. *moggii.*)

Moraea moggii can be distinguished from other members of the *Grandiflora* group by its solitary habit, slender, canaliculate leaf, and large flower. It is most easily confused with *M. spathulata*, some forms of which are very similar, but the two can usually be distinguished by the solitary habit of *M. moggii* compared with *M. spathulata*, which typically grows in clumps. Apart from this, *M. moggii* is generally a late flowering species, while *M. spathulata* flowers in spring or summer, excepting *M. spathulata* subsp. *autumnalis* which occurs in southern Natal and the adjoining area of the Cape Province.

Some doubt has been thrown on the identity of the type of *M. moggii*, a specimen collected by Dr. A. O. D. Mogg and housed at the National Herbarium. The locality given on the label is Struben's Farm, Pretoria, an area where *M. moggii* does not grow. When asked about the problem, Dr. Mogg suggested that the plant originally came from Haenertsburg, where his family once farmed. Although he was not positive on this point, his suggestion does seem likely, for the plant typified by *M. moggii* is very common around Haenertsburg. A photograph accompanying the type specimen also adds confusion, as this is of a small flowered plant, not *M. moggii*, but probably *M. stricta.* There is, however, no reason to reject *M. moggii*, because N. E. Brown indicated quite clearly the type specimen, and this can readily be matched with plants occurring in the Haenertsburg area.

Moraea moggii has been divided into two subspecies, occurring in different parts of the summer rainfall area. These have in common the solitary habit, and slender canaliculate leaf, combined with fairly large size, and all forms grow in open, short grassland, usually in montane areas. *Moraea moggii* may be found later to be an unnatural species, but it is difficult if even possible to satisfactorily distinguish the various forms, races, and the two subspecies on any but geographical grounds.

KEY TO THE SUBSPECIES

1. Flowering in late February to April; flowers yellow; occurring in the eastern Transvaal and Swaziland ..... a. subsp. *moggii*
1′. Flowering in December or January, occasionally later; flowers usually white, sometimes yellow; occurring in Zululand and the Wakkerstroom area of the Transvaal ..... b. subsp. *albescens*

16a. subsp. **moggii**

Prophylls firm, dark brown above, paler and veined below, inner rarely less than 15 cm long. *Leaf* grey-green, glaucous, 4–10 mm wide, not ribbed when fresh. *Flowers* yellow, veined purple-brown.

Flowering time: Late February to April.

Distribution: Short grassveld, from Haenertsburg to Mbabane, on mountain slopes (Fig. 11).

The typical subspecies can be distinguished from the other subspecies by its glaucous leaf, well-developed prophylls, and otherwise by its distribution in the

eastern Transvaal and Swaziland. It is typically autumn flowering but has been found in flower as early as February and as late as May.

23.29 (Pietersburg): Wolkberg (-DD), *Meeuse 9910* (PRE).
23.30 (Tzaneen): Sarahsdrift (-CA), *Scheepers 622* (PRE); Duiwelskloof, *Scheepers s. n.* (PRE); Magoebas Kloof Hotel (-CC), *Mauve 4787* (PRE).
24.29 (Zebediela): Ashmole Dales (-BB), *Pole-Evans s. n.* (PRE 19012).
24.30 (Pilgrims Rest): The Downs (-AA), *Junod 4135* (PRE); *Codd & Dyer 7750* (PRE); Three Sisters Mountain (-DB), *Galpin s. n.* (BOL 30819); Belvedere, Graskop district (-DD), *Davidson 165* (J).
24.31 (Acornhoek): Klaserie (-CA), *Holland s. n.* (BOL 30820).
25.30 (Lydenburg): Santa siding (-AC), *Reynolds 2309* (PRE); between Lunsklip and Belfast (-CA), *Mauve & Leistner 3273* (PRE); Waterval Boven (-CB), *Rogers 14469* (PRE); Mashonamini, Airlie (-DA), *Cross 109* (NBG); Nelsberg, Barberton (-DD), *Reynolds 2277* (PRE).
25.31 (Komatipoort): Barberton (-CC), *van Dam s. n.* (PRE 21157).

16b. subsp. **albescens** Goldbl., subsp. nov. Type: Tafelkop near Wakkerstroom, *Mauve & Tolken 4524* (PRE, holotype, BOL, isotype).

Prophylla rigida ad submembranacea, brunnea, interius raro excedentum 15 cm, plerumque circa 10 cm longum. *Folium* ad 1.5 cm latum, pallidum, viridis aut aliquantum glaucum, nervis prominentibus etiam in vivo. *Flores* albi, cremei aut lutei, viridibus aut purpureo-brunneis nervosis. *Rami styli* et cristae saepe purpurascentes.

Prophylls firm to submembranous, light brown, inner seldom reaching more than 15 cm in length, usually less than 10 cm. *Leaf* to 1.5 cm wide, light green or somewhat glaucous, veins occasionally prominent even in fresh material. *Flowers* white, cream or sometimes yellow, veined green, purple or brown; *style branches* and crests often suffused with purple.

Flowering time: Summer, occasionally extending to late autumn.

Distribution: Open grassland in Zululand and eastwards to the Utrecht–Wakkerstroom area (Fig. 11).

Moraea moggii subsp. *albescens* appears at first to be a very distinct taxon, but when the whole range of material from areas surrounding the type locality are examined, plants are found to differ in color and time of flowering, and it becomes increasingly difficult to distinguish it from subsp. *moggii*. Indeed it is possible that subspecific rank is too high, but in the absence of intermediates in the intervening areas of southern Swaziland, this taxon should be accorded recognition at subspecific level.

27.30 (Vryheid): Tafelkop, Wakkerstroom (-A), *Mauve & Tolken 4524* (PRE); near Wakkerstroom (-AC), *Devenish s. n.* (PRE); Donkerhoek, Utrecht district, *Devenish 544, 1253* (PRE); Wakkerstroom, *van Dam s. n.* (PRE 24322).
27.31 (Louwsberg): Ngome (-CD), *Strey 9426* (PRE).
28.31 (Nkandla): 18 km W of Melmoth (-CA), *Schelpe 5181* (BOL, SAM); Melmoth (-CD), *Gerstner 4315* (PRE); near Entumeni, *Wood 3960* (NH, SAM); near Eshowe, Umhlatuzi valley (-D), *Gerstner s. n.* (NH 22560).
Unknown localities: Lancaster Hill summit, *Galpin 9759* (PRE); Zululand, *Wylie s. n.* (NH 2446).

17. **Moraea muddii** N. E. Br., Trans. Roy. Soc. S. Africa 27: 346. 1929. Type: Mac Mac Creek, *Mudd s. n.* (K, holotype).—Fig. 2A.

Plants 15–70 cm but usually about 35 cm high, solitary. *Corm* about 1.5 cm in diameter, sometimes covered by straw-colored fibres of previous seasons.

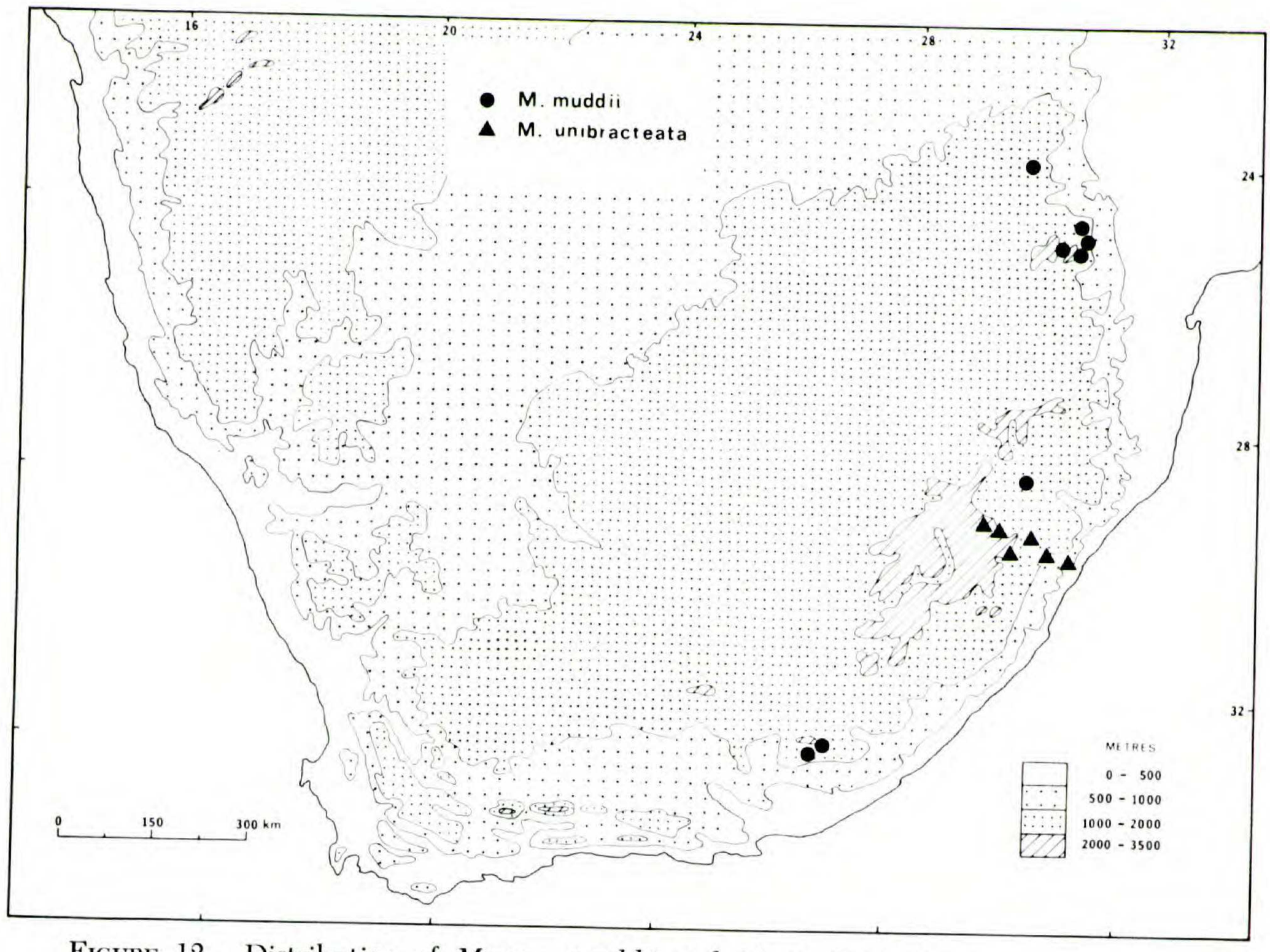

FIGURE 12. Distribution of *Moraea muddii* and *M. unibracteata*.

Prophylls brown, usually broken vertically into irregular strips. *Leaf* linear, canaliculate, rarely to 6 mm wide, usually overtopping the inflorescence. *Scape* erect, unbranched, covered by two bract leaves. *Bract leaves* 2–3, entirely sheathing, herbaceous with dry apex, 8–12 cm long. *Inflorescence* several flowered, 7–12 cm long, usually about 9 cm; outer spathe somewhat shorter than inner; apices dry, brown. *Flowers* yellow; *outer perianth segments* lanceolate, 3.5–5 cm long, 1.2–2 cm wide, claw 1.5–2 cm long; *inner segments* lanceolate, to 3.5 cm long and 7 mm wide. *Filaments* up to about 1 cm long, joined for lower two-thirds; *anthers* to 9 mm long, not reaching the stigma. *Style* about 3 mm, branches to 1.3 cm, crests about 1 cm long. *Ovary* oblong, about 1.5 cm long. *Seeds* disc shaped, testa spongy.

Flowering time: October to December, rarely later.

Distribution: Mountainous regions of the summer rainfall area (Fig. 12).

Moraea muddii, one of the smallest of the yellow flowered species of *Moraea*, occurs in rather moist grassland along the mountain ranges of the summer rainfall area. It flowers from late spring to midsummer and rarely later, although it has been found in bloom during March.

Its distinguishing characters are mostly quantitative, the plant and its flowers generally being comparatively small, although considerable variation does exist. The nature of the prophylls, being soft, brown, and irregularly broken vertically is also characteristic (Fig. 2A). Its small size and solitary habit distinguish it from *Moraea spathulata*; its very slender leaf, comparatively soft prophylls, and early

flowering period from the forms of *M. moggii*; and its several bract leaves from *M. unibracteata*. This last mentioned species is probably very closely allied to *M. muddii* and may be found to be a regional race occurring in Natal. Further collections are necessary to clarify this point. *Moraea muddii* has a rather disjunct range, being common in the mountains of the eastern Transvaal and occurring again in the eastern Cape, where only a few collections have been made, some as far west as the Hogsback. This break in the distribution pattern is unusual, but the plants from both areas are similar and do not appear to be different to any significant degree. There also seems little doubt that *M. muddii* does not occur in the Natal Drakensberg, where it would be expected, for this area has been well collected.

23.29 (Pietersburg): Haenertsburg (-DD), *Eastwood s. n.* (PRE 14894).
24.30 (Pilgrim's Rest): Graskop (-DD), *Louw 2391* (PRE); *Galpin 14529* (PRE); *Thorncroft 988* (PRE); God's Window, *Mogg & Davidson 32989* (J).
25.30 (Lydenburg): Mount Anderson, (-BA), *Galpin 13585* (BOL, PRE); Sabie/Lydenburg road, *Codd 4420* (PRE); Sabie Falls (-BB), *Burtt-Davy 1548* (BOL); Sabie Valley (-BB), *Grant s. n.* (K).
28.30 (Dundee): Kafir Drift, Utrecht (-CA), *Thode 362A* (NH, PRE).
32.26 (Fort Beaufort): Hogsback Mountain (-DB), *Rattray 400* (BOL); Gaika's Kop, Amatolas, *Grant 3068* (BOL, MO).

18. **Moraea unibracteata** Goldbl., sp. nov. Type: Nottingham Road, *Galpin 9457* (PRE, holotype, CPF, NU, isotypes).

Planta ad 35 cm alta, solitaria. *Cormus* circa 1 cm diam., munitus paucis tenuibus fibris. *Prophylla* brunnea integra aut fracta irregulariter. *Folium basale* inflorescentiam excedens, 0.2–1 cm latum, canaliculatum. *Ccapus* erectus simplex. *Folium vaginans* solitarium, prope basem inflorescentiae insertum, inflorescentiam imbricatum. *Inflorescentia* pauciflora, spathae 6–8 cm longae, exterior aliquantum brevior. *Flores* pallidi lutei, purpureis venis (flores sicci raro caerulei); *perianthii segmenta exteriora* 3–4.5 cm longa, lanceolata; *segmenta interiora* 3–4 cm longa. *Filamenta* ad 8 mm connata in pars inferiore; *anthera* 7–9 mm. *Stylus* 4–5 mm longus, rami ad 1 cm longi, crista ad 1–3 cm longa. *Germen* ad 1.8 cm longum.

Plants small, to 35 cm high, solitary. *Corm* about 1 cm in diameter, covered by fine, pale fibrous tunics. *Prophylls* pale brown, entire or more usually broken irregularly. *Basal leaf* exceeding the inflorescence, 0.2–1 cm wide, canaliculate. *Scape* erect, simple. *Bract leaf* solitary, inserted at base of inflorescence and overlapping the spathes. *Inflorescence* few-flowered, spathes 6–8 cm long, outer somewhat shorter. *Flowers* pale yellow, veined with purple (drying pale blue occasionally); *outer perianth segments* 3–4.5 cm long, lanceolate; *inner segments* 3–4 cm long, narrowly lanceolate. *Filaments* about 8 mm long, joined in lower part; *anthers* 7–9 mm long. *Style* 4–5 mm long, branches about 1 cm long, crests to 1.3 cm long. *Ovary* to 1.8 cm long.

Flowering time: October to November.
Distribution: Natal Midlands and the lower altitudes of the Drakensberg (Fig. 12).

All too little is known about *Moraea unibracteata*, which appears somewhat intermediate between *M. muddii* and *M. spathulata*. From the observations recorded on the few specimens collected, *M. unibracteata* is clearly a representative of the *Grandiflora* group, and its small size and similar prophylls indicate a close relationship to *M. muddii*. It can, however, always be recognised by having only

a single bract leaf, located just below the inflorescence, and overlapping the spathes.

29.29 (Underberg): Giants Castle, Meander Valley (-AB), *Trauseld 450* (NU, PRE), *1011* (PRE); Mooi River district (-B), *Mogg 3142* (PRE); Tabamhlope (-BA), *Wylie s. n.* (NU 41862); Impendhle (-DB), *Levett 51* (NH).

29.30 (Pietermaritzburg): Curry's Post (-AC), *Mogg 6445* (PRE); Nottingham Road, *Galpin 9457* (PRE); Inanda (-DB), *Wood 487* (SAM).

19. **Moraea carnea** Goldbl., sp. nov. Type: Giant's Castle, *Trauseld 481* (PRE, holotype, CPF, NU, isotype).

Planta ad 50 cm alta, solitaria. *Cormus* ad 1.5 cm diam., munitus fibris tenuibus reticulatis. *Prophylla* brunnea, fracta irregulariter. *Folium basale* lineare, canaliculatum, inflorescentiam excendens, ad 6 mm latum. *Scapus* erectus, simplex. *Folia vaginantia* 3–4, 4–8 cm longa, apicibus acuminatis et siccis. *Inflorescentia* pluriflora, spatha interior 7–10 cm, exterior 2–3 cm brevior. *Flores* cremei ad carnei, nervis roseis; *perianthii segmenta exteriora* ad 6 cm longa, limbus 3–3.5 cm longus et ad 2.5 cm latus; *segmenta interiora* ad 5 cm longa et ad 1 cm lata. *Filamenta* 1–1.2 cm longa, *antherae* circa 1 cm longae, breviores quam filamenta. *Stylus* 1 cm longus, rami ad 1.7 cm, cristae ad 1.5 cm longae. *Germen* circa 2 cm longum, *capsula* rostrata.

Plants medium in size, up to 50 cm high, solitary. *Corm* to 1.5 cm in diameter, covered by a fine reticulation. *Prophylls* brown, broken vertically in an irregular manner. *Basal leaf* linear, overtopping the inflorescence, to 6 mm wide, canaliculate. *Scape* erect, unbranched. *Bract* leaves 3–4, entirely sheathing, 4–8 cm long, with dry acuminate apex. *Inflorescence* several flowered, inner spathe 7–10 cm long; outer 2–3 cm shorter. *Flower* yellow-cream to flesh-colored marked with pink to brown veins, style crests uniformly brown, nectar guide yellow; *outer perianth segments* to 6 cm long, limb 3–3.5 cm long and to 2.5 cm (2–2.5) wide; *inner segments* to 5 cm long and about 1 cm broad. *Filaments* 1–1.2 cm long, joined for about two-thirds length; *anthers* about 1 cm long, shorter than the filaments, not reaching the stigmas. *Style* about 1 cm long and branches to 1.7 cm long, crests to 1.5 cm long. *Ovary* about 2 cm long; *capsule* beaked.

Flowering time: Early Summer.

Distribution: Grass slopes in the Drakensberg above 2,000 m (Fig. 11).

Icon: Trauseld, Wild Flowers of the Natal Drakensberg. 37, *fig. 418.* 1969.

Moraea carnea and the following species, *M. ardesiaca*, are closely related species, both allied to *M. muddii* and may, in fact, replace this species in the Natal Drakensberg. *Moraea carnea* and *M. ardesiaca* are the only known members of the *Grandiflora* group in South Africa that are not colored yellow to white. The color difference in a group where yellow so predominates is one of the prime reasons for recognising these as distinct species, although, of course, there are other characters of importance.

The color is by far the easiest method of recognising the two, but unfortunately in old material, without color notes, or with poorly pressed flowers, this is of little use and then less obvious features such as the prophylls must be relied upon. In the absence of the latter, and without well preserved flowers, identification is very difficult.

Moraea carnea itself has cream colored petals, veined and flushed purple to flesh pink. In most individuals the inner petals and especially the style crests

are dark pink. The key character, whether the anthers are longer (in *M. ardesiaca*) or shorter (in *M. carnea*) than the filaments, appears to be very useful and worked in all specimens examined by the author. Apart from the floral characters, it is mainly the stouter stems and firmer leaf that distinguish this species from *M. muddii*. A second species more easily confused is *M. ardesiaca*, usually a slate-blue to mauve flowered plant. Again, when flowers are badly preserved, identification is difficult, but *M. ardesiaca* is a taller plant, with a longer, broader leaf and distinctly broader petals, and in most cases this will be sufficient in distinguishing the two species. *Moraea carnea* and *M. ardesiaca* occur in the Natal Drakensberg but are not found together, the former occupying high altitudes from 2,000 m upwards and the latter usually below this. As can be expected, some overlap does occur, but, nevertheless, it seems that these two species occupy different ecological niches and that the differences between them are significant. Further collecting and examination in the wild state is still necessary to establish whether in fact these two species are distinct.

28.29 (Harrismith): Umlambonja Buttress (-CC), *Schelpe 995* (NU); Cathedral Peak Forest Station (-CD), *Killick 1145* (PRE).

29.29 (Underberg): Giants Castle (-AB), *Symons s. n.* (PRE 25242); Judge area, Giants Castle, *Trauseld 481* (NU, PRE); Sani Pass (-CB), *Hilliard 969* (NU).

20. **Moraea ardesiaca** Goldbl., sp. nov. Type: Royal Natal National Park, *Trauseld 84* (PRE, holotype).

Planta ad 70 cm alta, plerumque solitaria. *Cormus* ad 1.5 cm diam. *Prophylla* brunnea, ad 15 cm longa, fracta irregulariter. *Folium basale* canaliculatum, plerumque caulem excedens, 5–10(–25) mm latum. *Scapus* erectus, simplex. *Folia vaginantia* 2 raro 3, circa 10 cm longa. *Inflorescentia* pluriflora, spatha interior 9–14 cm, exterior 2–4 cm brevior. *Flores* ardesiaci, malvescenti-brunnei; *perianthii segmenta exteriora* ad 7.5 cm longa, limbus ad 5 cm longus et 2.5–3.5 cm latus; *segmenta interiora* 5–6 cm longa. *Filamenta* 8–10 mm longa; *antherae* ad 1.2 cm longae, aequales aut longiores quam filamenta. *Styli rami* ad 1.5 cm longi, cristae 1.5–2 cm longae. *Capsula* rostrata.

Plants medium to large, to 70 cm high, usually solitary. *Corm* to 1.5 cm in diameter. *Prophylls* light brown, to 15 cm long, irregularly broken vertically. *Basal leaf* canaliculate, usually exceeding the stem, 5–10 (–25) mm wide. *Scape* erect, simple. *Bract leaves* 2, rarely 3, about 10 cm long, situated on upper part of stem, lower part often naked. *Inflorescence* several-flowered, inner spathe 9–14 cm, outer 2–4 cm shorter. *Flower* slate-blue, pale mauve, purple-brown, nectar guide narrow, linear, light yellow; *outer perianth segments* to 7.5 cm, limb to 5 cm long and 2.5–3.5 cm wide; *inner perianth segments* 5–6 cm long. *Filaments* 8–10 mm long, joined in lower part; *anthers* to 1.2 cm long, as long or longer than the filaments, not reaching the stigmas. *Style* joined at base, branches to 1.5 cm, crests 1.5–2 cm long. *Capsule* beaked.

Flowering time: November to January.

Distribution: Drakensberg, 1800–2200 m (Fig. 11).

Icon: Trauseld, Wild Flowers of the Natal Drakensberg. 37, *fig. 84*. 1969.

As discussed under the previous species, *Moraea carnea*, *M. ardesiaca* appears to be most closely related to *M. muddii*, and possibly the former two species replace *M. muddii* in the Drankensberg area. *Moraea ardesiaca* can easily be

recognised from fresh material by its large slate-blue to mauve flowers. When dry and in the absence of color notes, recourse must be made to ecological data and careful measurement of the stamens and the perianth segments. Confusion with *M. carnea* is most common, but this species is generally smaller and has narrower perianth segments. It also occurs at higher altitudes (usually above 2,300 m), while *M. ardesiaca* is generally found below this, although some overlap appears to occur.

28.28 (Bethlehem): Along Mahai (-DA), *Schweidkerdt 737* (PRE); Royal Natal National Park (-DD), *Trauseld 84* (PRE); Devils Hoek, Royal Natal National Park, *Galpin 9510* (PRE); Devils Hoek Valley, *Galpin 30816* (BOL).

28.29 (Harrismith): Van Reenen (-AD), *Wood 12158* (PRE); *Wood 4526* (BOL, NH); *Franks s. n.* (NH 12158).

29.29 (Underberg): Highmoor, Little Berg (-BC), *Killick & Vahrmeier 3629* (PRE).

21. **Moraea graminicola** Oberm., Fl. Pl. Africa. *Pl. 1526.* 1969. Type: Clovelly farm near Mooi River, *Mauve 4466* (PRE, holotype, BOL, isotype).

Plants 25–60 cm at flowering time, solitary. *Corm* to 1.5 cm in diameter, covered with brown, reticulate tunics sometimes extending upwards a short distance. *Prophylls* 3–4, innermost rarely more than 10 cm, pale, submembranous, entire or frayed or broken at apex. *Basal leaf* usually exceeding stem at flowering time, linear, 0.7–2.5 cm wide. *Scape* erect simple (rarely branched in subsp. *notata*). *Bract leaves* 1–2 or 3, herbaceous, often overlapping, to 15 cm long, apex long and tapering, not dry or brown. *Inflorescence* several flowered, inner spathe 14–18 cm long, outer several cm shorter, entirely herbaceous or with a dry brown apex. *Flower* pale yellow to grey veined with mauve, especially on crests, self-colored or distinctly blotched with mauve at the base; *outer perianth segments* 6–7.5 cm long, limb to 4.5 cm long and to 3 cm wide; ovate with tapering claw; *inner segments* lanceolate 4–5 cm long and up to 1.5 cm wide. *Filaments* 0.8–1.2 cm long, joined in lower half; *anthers* about 1.3 cm long. *Style* 4 mm, branches to 2 cm, crests 1–1.5 cm, flushed with mauve. *Ovary* about 2 cm long; *capsule* to 3 cm long, depressed, disciform. *Chromosome number* (subsp. *graminicola*) $2n = 12$, *Mauve 4466* (PRE).

Icon: Obermeyer, Fl. Pl. Africa 39: *Pl. 1526.* 1969. (= subsp. *graminicola.*)

Two subspecies are recognised, the typical form occurring in Natal, flowering early, often before the spring rains, and a second form, to the south in the Transkei. In the latter area plants are generally taller and tend to flower later. Both subspecies are found in open grassland and are solitary.

KEY TO THE SUBSPECIES

1. Bract leaves 1 or 2; stigmas not darkly blotched at base; occurring in Natal ..... a. subsp. *graminicola*

1′. Bract leaves 3; stigmas darkly blotched at base; occurring in the Transkei .... b. subsp. *notata*

21a. subsp. **graminicola**

Plants seldom exceeding 45 cm. *Scape* unbranched, bearing 1 to 2 overlapping bract leaves. *Flowers* pale yellow to grey, veined with mauve; *style crest* sometimes flushed a pale mauve, but not darkly marked at the base.

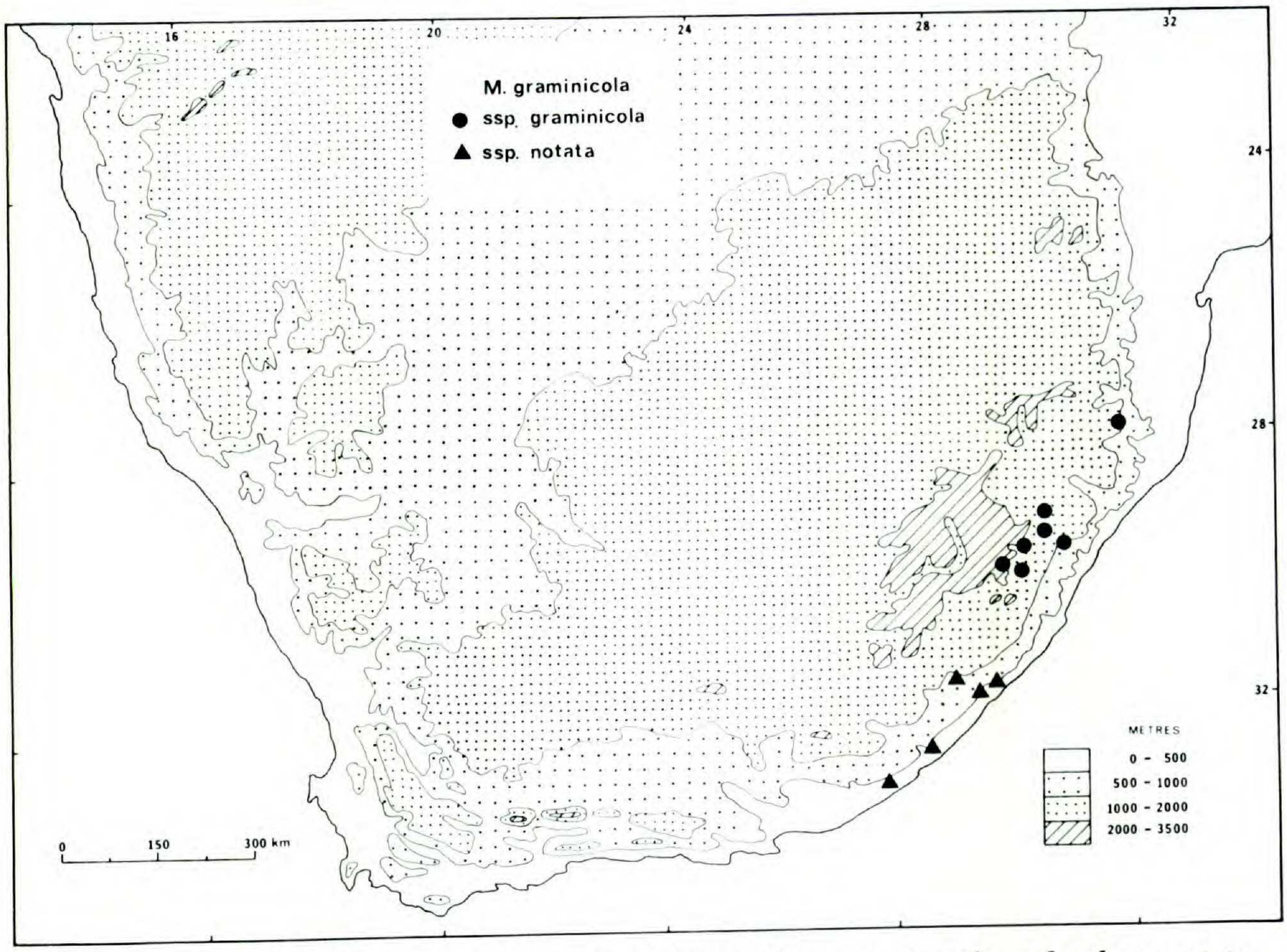

FIGURE 13. Distribution of *Moraea graminicola* subsp. *graminicola* and subsp. *notata*.

Flowering time: August to November.
Distribution: Grasslands in central Natal (Fig. 13).

This subspecies is fairly well known and has been fully described, with ecological observations, in *Flowering Plants of Africa*, where a good illustration can be found.

27.31 (Louwsburg): Near Ngome (-CD), *Gerstner 4876* (PRE).
29.29 (Underberg): Near Underberg (-C), *Dyer 3265* (PRE); Everglades, Impendle district (-DB), *Moll 1259* (NU, PRE); near Bulwer station (-DD), *Killick & Marais 2098* (PRE).
29.30 (Pietermaritzburg): Clovelly farm, Mooi River (-AA), *Mauve 4466* (BOL, PRE); Nottingham Road (-AC), *Galpin 9442* (PRE); Hilton road (-CB), *Williams s. n.* (PRE).

21b. subsp. **notata** Goldbl., subsp. nov. Type: East of Libode, *Codd 10691* (BOL, holotype, PRE, isotype).

Planta 40–60 cm alta, plerumque grandior quam subsp. *graminicola*. *Scapus* simplex, raro ramosus. *Folia vaginantia* plerumque 3. *Flores* pallidi lutei, aut cremei. *Cristae styli* notatae brunneo-purpureo colore.

Plants 40–60 cm high, usually larger than subsp. *graminicola*. *Scape* simple or occasionally branched; bearing 3 bract leaves. *Flowers* pale yellow to cream; *style crest* marked at base a dark brown to mauve color.

Flowering time: September to January.
Distribution: Grasslands in the Transkei (Fig. 13).

This plant, here accorded subspecific rank, is very like the typical *Moraea*

graminicola, as can be seen from its similar, pale rather truncate, submembranous prophylls (Fig. 2C). It is usually later flowering than subsp. *graminicola* and, from the few collections seen, is a generally more robust plant. It is very easy to recognise by the characteristic dark marking at the base of the style crests, a feature otherwise known only in *M. huttonii*, a species growing in large clumps along streams or in other moist situations.

Moraea graminicola needs more investigation before the present treatment can be validated; subsp. *graminicola* is fairly well known in a limited area of Natal, but it probably occurs outside this area. Southern Natal and Pondoland particularly should be surveyed for this species, and it is possible that forms intermediate between the two subspecies will be found in this intervening area between the known ranges for each subspecies.

31.28 (Umtata): Umtata (-DB), *Barker s. n.* (NBG 58666).

31.29 (Port St. Johns): 80 km SE of Umtata (-C), *Reynolds 3037* (PRE); E of Libode (-CB), *Codd 10691* (BOL, PRE); Mlengana Pass, *Schelpe 5026* (BOL, SAM); 12 km N of Umzimvubu River (-DA), *Theron 1555* (BOL).

32.28 (Butterworth): Near Kei River mouth (-CB), *Flanagan 1072* (BOL, PRE); *Compton 17646* (NBG).

33.27 (Peddie): East London (-BB), *Peacock s. n.* (SAM 65682).

22. **Moraea galpinii** (Bak.) N. E. Br., Trans. Roy. Soc. S. Africa 18: 346. 1929. —FIG. 2D.

Moraea spathacea var. *galpinii* Bak., Fl. Cap. 6: 14. 1896. Type: *Galpin 459*, Saddleback range (K, holotype, PRE, BOL, isotypes).

Plant reaching to 30 cm above ground, solitary or in small clumps. *Corm* to 1.8 cm in diameter, covered by fibrous remains of tunics of previous seasons. *Prophylls* (of flowering stem) dark brown to black, fairly rigid vertical fibres often reaching above the ground (fibres of previous seasons often present). *Basal leaf* present or absent at flowering time, eventually exceeding the inflorescence; canaliculate to terete with adaxial groove, 1–10 mm wide. *Scape* erect, unbranched. *Bract leaves* usually 3 or 4, rarely 2, 6–8 cm long, usually overlapping. *Inflorescence* several-flowered, inner spathe to 11 cm long, outer about 7 cm. *Flower* yellow with orange-gold nectar guides; *outer perianth* segments 4–6.5 cm long, limb to 4 cm long and 2.2 cm broad, obtuse to retuse; *inner perianth segments* lanceolate, to 5 cm long and about 1 cm broad; obtuse to retuse. *Filaments* to 8 mm long, joined for two-thirds of length; *anthers* to 9 mm. *Style* 6 mm long, branches to 1.3 cm, crests 1–1.5 cm long. *Ovary* about 1 cm long, extending to 2 or 2.5 cm as flower wilts.

Flowering time: August to early November.

Distribution: Rocky hill slopes from Mt. Anderson to East Griqualand (Fig. 14).

Icon: Obermeyer, Fl. Pl. Africa 40: *Tab. 1582.* 1970. (= subsp. *galpinii.*)

Moraea galpinii can be recognised by its distinctive, firm prophylls, which are dark colored and divided into fairly thick vertical fibres. These tend to persist, and they form a dense layer round the base of the plant (Fig. 2D). It is strange to note that immature plants, *i. e.* those not yet at flowering age, have quite different, soft, entire, membranous prophylls.

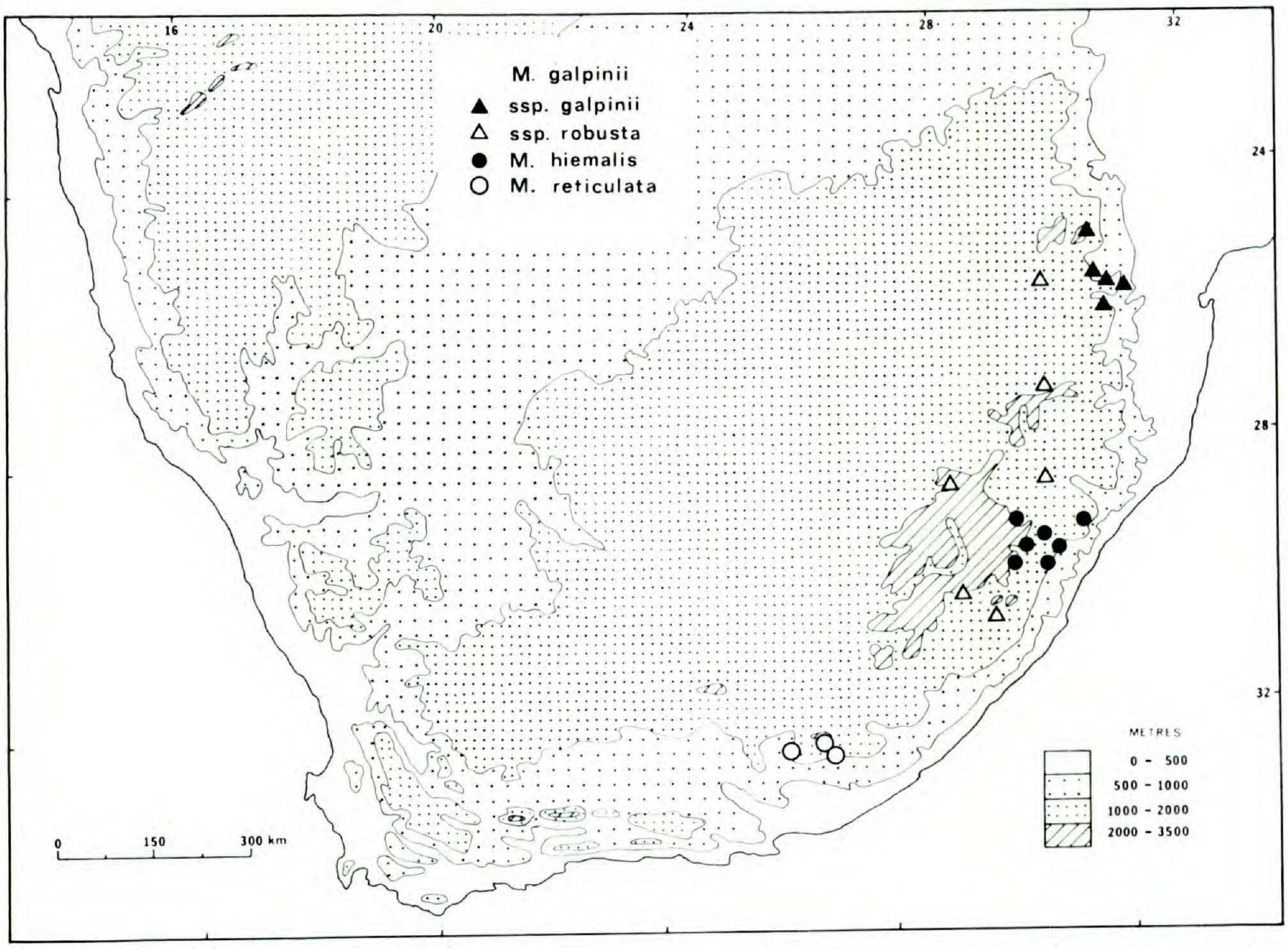

FIGURE 14. Distribution of *Moraea galpinii* subsp. *galpinii* and subsp. *robusta*, *M. hiemalis*, and *M. reticulata*.

Moraea galpinii is itself one of the smaller flowered members of the *Grandiflora* group, though some plants referred to subsp. *robusta* may be quite large. Plants flower early in spring, often before the first rains, and sometimes flowers appear before the leaf is evident. Whether this is due to veld burning, which destroys the apex of the emergent leaf, or whether it really does develop late in some seasons, is not clear.

There appear to be discrete forms of *Moraea galpinii*, the typical one found locally around Barberton and extending south into the adjacent areas of Swaziland and north to Mt. Anderson, and a second more robust form which is widespread, occurring from the Belfast-Machadodorp area of the Transvaal to the Eastern Cape. The second form has not often been collected, and very little is known about it. The structure of the prophylls is, however, so distinctive that there is no doubt it is part of the *M. galpinii* complex. It is with some hesitation that this species is treated as comprising two subspecies, but this is the most acceptable in the present state of our knowledge.

KEY TO THE SUBSPECIES

1. Leaf terete with adaxial groove, 1–2.5 mm in diameter; outer perianth segments to 4 cm long ---------- a. subsp. *galpinii*
1′. Leaf canaliculate to flat, more than 2.5 mm wide; outer perianth segments to 6.5 cm long ---------- b. subsp. *robusta*

22a. subsp. **galpinii**

Plants smaller than subsp. *robusta*, to 30 cm high. *Basal leaf* present or not yet developed at flowering time, eventually exceeding the inflorescence, terete to 2.5 mm wide. *Bract leaves* 3, rarely 2 or 4. *Flowers* yellow; *outer perianth segments* up to 5 cm long.

Flowering time: August to early October.

Distribution: Rocky mountain slopes between Mt. Anderson and Mbabane (Fig. 14).

Moraea galpinii was first described by Baker as a variety of *M. spathulata* (as *spathacea*) and was elevated to specific rank by N. E. Brown in 1929. Although at first it was known only from very limited material, it has now become clear that it is a fairly common and widespread species. The typical subspecies is well understood, having been rediscovered by Mrs. A. A. Mauve, who described it in *Flowering Plants of Africa* in 1969.

25.30 (Lydenburg): Long Tom Pass (-BA), *Rauch & Schlieben 9774* (PRE); Mount Anderson, *Humbert 10957* (P); Kaapsche Hoop (-DB), *Rogers s. n.* (BOL 30817, PRE 18815).
25.31 (Komatipoort): Barberton (-CC), *Thorncroft s. n.* (GRA 25516, PRE 25972); near Havelock Mine, *Mauve 4802* (PRE); Saddleback Range, *Galpin 459* (BOL, PRE); 27 km SE of Barberton (-CD), *Codd 1621* (PRE).
26.31 (Mbabane): Forbes Reef (-AA), *Compton 26942* (PRE); *Compton 27979* (NBG).

22b. subsp. **robusta** Goldbl., subsp. nov. Type: Naauwhoek, Utrecht district, *Devenish 109* (PRE, holotype).

Planta grandior quam subsp. *galpinii*, ad 40 cm alta. *Folium basale* canaliculatum aut subteres 3–10 mm latum. *Foli vaginantia* 3–4. *Flores* pallidi lutei ad albi; *perianthii segmenta exteriora* plerumque longiora quam subsp. *galpinii*, ad 6.5 cm longa.

Plants larger than subsp. *galpinii*, to 40 cm high. *Basal leaf* canaliculate to subterete and 3–10 mm wide. *Bract leaves* 3–4. *Flowers* pale yellow, to white; *outer perianth segments* usually longer than subsp. *galpinii*, up to 6.5 cm long.

Flowering time: August to mid-November.

Distribution: Eastern Transvaal to eastern Cape (Fig. 14).

As already mentioned, this subspecies is not fully understood, but represents the somewhat more robust, larger flowered group with fibrous corm tunics exactly like those of typical *Moraea galpinii*. It can be distinguished from subsp. *galpinii* by its larger flower and leaf, which is canaliculate or subterete, but wider than the terete leaf of subsp. *galpinii*.

25.30 (Lydenburg): Near Machadodorp (-CA), *Grosser s. n.* (PRE 1607).
27.30 (Vryheid): Naauwhoek, Utrecht district (-AC), *Devenish 109* (PRE); Oshoek, Wakkerstroom, *Mauve 4486* (PRE).
28.28 (Bethlehem): Near General Will Hill (-DA), *Liebenberg 7324* (PRE).
28.30 (Dundee): Kafir Drift, Utrecht (-CA), *Thode 363A* (NH).
30.28 (Matatiele): Quachasnek (-BB), *Strey 4318* (NH).
30.29 (Kokstad): Kokstad (-CB), *Goodall s. n.* (BOL 8278).

23. **Moraea hiemalis** Goldbl., sp. nov. Type: Lions River, *Obermeyer s. n.* (PRE 33562, holotype).

Planta ad 45 cm alta, solitaria. *Cormus* 1 cm diam. *Prophylla* brunneum, fragile, integrum aut fractum irregulariter, argenteum et purpureum infra. *Folium basale* excedens inflorescentiam, teres. *Scapus* erectus simplex. *Folia vaginantia* 3–5, imbricata, ad 14 cm longa.

Inflorescentia pluriflora, spatha interior 4–8 cm longa, exterior aequalis aut brevior. *Flores* lutei; *perianthii segmenta exteriora* ad 5 cm longa, limbus ad 3.5 cm longus et ad 2.4 cm latus; *segmenta interiora* ad 4 cm longa et 1.5 cm lata. *Filamenta* ad 8 mm longa, *antherae* ad 1 cm longae. *Stylus* circa 4 mm longus, rami ad 1.3 cm longi, cristae circa 1 cm longae. *Germen* circa 1.5 cm longum, *capsula* 2–2.5 cm longa.

Plants to 45 cm high, solitary. *Corm* about 1 cm in diameter, tunics not known. *Prophylls* brown, brittle, entire, or irregularly broken, ribbed and silver and purplish below. *Basal leaf* over-topping inflorescence, margins tightly inrolled (terete in section), about 5 mm in diameter, unopened. *Scape* erect, simple. *Bract leaves* (3–)4–5, overlapping, to 14 cm long. *Inflorescence* several-flowered, inner spathe 8–14 cm, outer equal or slightly shorter; herbaceous, with dry light brown apex. *Flower* yellow, darkly veined; *outer perianth* segments to about 5 cm long, limb to 3.5 cm long and to 2.4 cm wide; *inner segments* erect to about 4 cm long and 1.5 cm wide. *Filaments* to 8 mm long, free in upper third; *anthers* to 1 cm long. *Style* about 4 mm long, branches to 1.3 cm long, crests about 1 cm long. *Ovary* about 1.5 cm long. *Capsule* 2–2.5 cm long and about 1 cm wide.

Flowering time: July to August.

Distribution: Grassland in central Natal (Fig. 14).

Moraea hiemalis is a distinct segregate of the *M. spathulata* complex and is accorded specific rank. It is isolated by its flowering time from representatives of *M. spathulata* in the same area, as it flowers in July and August, while *M. spathulata* flowers later, from October onwards. Morphologically it can be distinguished by its terete leaf, the margins being tightly inrolled, and its solitary habit. The plants are also generally smaller in most features than typical *M. spathulata.*

29.29 (Underberg): Near Mooi River (-B) *Schlechter 3340* (BOL); Boston, Impendhle (-DB), *Beattie 40* (NU); Bulwer (-DC), *Gerstner s. n.* (NH 28756).

29.30 (Pietermaritzburg): Michael House (-AC), *Strey 3867* (NH, PRE); Balgowan, *Obermeyer s. n.* (PRE 33562); Elandskop (-BB), *Gibson s. n.* (NH 17300); Umgeni Poort (-CA), *Moll 957* (NU); Winters Kloff (-CB), *Wilson s. n.* (NH 17123); Hilton road, *Garbutt 36* (NU); World's View, *Douwes-Dekker 2* (NU); Town Hill, *Barker 3579* (NBG); 8 km E of Richmond (-CC), *Strauss 204* (NBG).

24. **Moraea reticulata** Goldbl., sp. nov. Type: Top of Katberg Pass, *Goldblatt 682* (BOL, holotype, MO, PRE, isotypes).

Planta solitaria raro caespitosula. *Cormus* ad 2 cm diam., munitus fibris. *Prophylla* fibrosa, reticulata interior ad 20 cm altum vaginans folium et scapum. *Folium basale* solitarium, canaliculatum, ad 1.5 cm latum, scapum excedens. *Scapus* 45–70 cm altus, erectus, simplex. *Folia vaginantia* 3–4, herbacea aut membranescentia in senectute ad 15 cm longa. *Inflorescentia* ad 15 cm longa, spatha exterior aliquantum brevior quam interior. *Flores* lutei; *perianthii segmenta exteriora* ad 7 cm longa et circa 2.5 cm lata; *segmenta interiora* 5–6 cm longa, ad 1.5 cm lata. *Filamenta* ad 1.3 cm longa, connata in parte inferiore; *antherae* lineares, albi, ad 1.5 cm longae. *Rami styli* ad 2 cm longi, cristae aliquantum breviores. *Germen* linear, 2–3 cm longum. *Capsula* ad 4 cm longa; *semina* disciformia.

Plants solitary, rarely in small clumps. *Corm* to 2 cm in diameter, covered by the decayed leaf bases and prophylls of previous seasons. *Prophylls* fibrous, reticulate, inner produced to 20 cm above ground in a network, sheathing leaf and scape. *Basal leaf* solitary, canaliculate (conduplicate when dry), to 1.5 cm wide, exceeding the scape. *Scape* 45–70 cm long, erect, simple. *Bract leaves* 3–4, green, becoming membranous late in season, to 15 cm long. *Inflorescence*

about 15 cm long, outer spathe slightly shorter than inner. *Flowers* bright yellow with orange nectar guide; *outer perianth segments* to 7 cm long and about 2.5 cm wide; *inner segments* 5–6 cm long and to 1.5 cm wide. *Filaments* to 1.3 cm long, joined in lower half; *anthers* linear, white, to 1.5 cm long. *Style branches* about 2 cm long, crests somewhat shorter. *Ovary* linear, 2–3 cm long. *Capsule* to 4 cm long; *seeds* depressed, disciform.

Flowering time: March to May.

Distribution: Amatola Mountains between Bedford and Cathcart, eastern Cape (Fig. 14).

The flowers of *Moraea reticulata* are similar to those of *M. spathulata*, but the plants themselves differ in being almost invariably solitary. True *Moraea spathulata* has been recorded from the same locality as *M. reticulata* where the former flowers in late spring or summer, while *M. reticulata* flowers in autumn, from March to May.

Moraea reticulata can always be recognised by its very characteristic prophylls, the inner one of which extends upwards well above the ground and forms a grey or brown network around the leaf and stem. This type of prophyll is found in some forms of *M. spathulata* but is never as strongly developed, and it also occurs in *M. alticola*. In the latter species, which is found at high altitudes in the Drakensberg, the reticulate prophyll is also strongly developed and often yellow. *Moraea reticulata* can, however, be easily distinguished from *M. alticola* as the latter grows in clumps and has broad, flat leaves in contrast to the canaliculate leaves of *M. reticulata*.

Moraea reticulata is, like *M. hiemalis*, a distinct segregate of the *Moraea spathulata* complex. Both the former species have been given specific rank, although it is clear that they are very closely allied to *M. spathulata*. The decision to accord them specific rank is based partly on their solitary habit and partly because they flower at quite different seasons from the forms of *M. spathulata* found in the same areas.

In contrast, the subspecies of *Moraea spathulata* flower at more or less the same time, or the flowering period grades from winter to summer, depending on decreasing latitude or differences in altitude. The subspecies *autumnalis* is an exception for it flowers later than other subspecies of *M. spathulata*. In this case, however, the caespitose habit of subsp. *autumnalis* has been regarded as indicative of close relationship with *M. spathulata*.

32.26 (Fort Beaufort): Bedford district (-CA), *Jeppe 850* (GRA); Baviaansrivierberg, Bedford, *Killick 850* (PRE); top of Katberg Pass (-DB), *Goldblatt 682* (BOL, MO, PRE); Hogsback, *Lewis 4422* (SAM); *Lubke & Jacot-Guillarmod 5632* (RUH); Happy Valley, Hogsback, *Johnson 1258* (GRA).

25. **Moraea spathulata** (L. f.) Klatt *in* Dur. & Schinz, Consp. Fl. Afr. 5: 152. 1895.

Iris spathulata L. f., Suppl. 99. 1781. Type: Wolwekraal, Langekloof, *Thunberg* in Herb. Thb. 1172 (UPS, holotype).

Plants to 1 m high, usually in clumps, rarely solitary. *Corm* to 2 cm in diameter, frequently covered by fibrous remains of old tunics and leaf bases.

Prophylls brown to pale straw, membranous to firm, entire or irregularly broken, or splitting into a fibrous reticulum above. *Basal leaf* overtopping stem, linear, flat to curved to canaliculate. *Scape* occasionally branched. *Bract leaves* herbaceous, 3–5, often overlapping, 9–18 cm long, apex dry, brownish. *Inflorescence* several-flowered, inner spathe 10–18 cm, outer a little shorter. *Flowers* deep to pale yellow with prominent veins, nectar guides deeper yellow-orange; *outer perianth segments* 3.5–7.5 cm long, limb to 4 cm long and about 2.5 cm wide; *inner segments* 3–6 cm long, less than 2 cm wide. *Filaments* 8–15 mm, joined in lower part; *anthers* 7–15 mm, purple. *Style* 2–3 cm long. *Capsule* to 5 cm long; *seeds* depressed, disciform.

Icones: Batten & Bokelmann, Wild Flowers of the Eastern Cape Province. *Pl. 28, fig. 1.* 1966; Courtenay-Latimer *et al.*, The Flowering Plants of the Tsitsikama Forest and Coastal National Park. *Pl. 18, fig. 5.* 1967.

Moraea spathulata is a widespread species of extremely variable nature. It occurs from the George district in the southern Cape where it flowers in winter to southern Zululand, the slopes of the Natal Drakensberg, and the Transvaal and Swaziland mountain areas where it may flower in summer or autumn. The species can be distinguished by its large bright yellow flowers, tall stems, and caespitose habit. It comprises numerous local races, but owing to the small and gradual differences between them, it is difficult to define many races. However, four subspecies are recognised here as distinct. Two other close allies of this species, *M. hiemalis* and *M. reticulata*, have been accorded specific rank (see discussion under *M. reticulata*).

Key to the Subspecies

1. Prophylls pale, submembranous, entire or frayed at apex, but not fibrous or reticulate; outer perianth segments rarely exceeding 5 cm; solitary or small clumps among rocks on hilltops in eastern Transvaal, Swaziland ..... c. subsp. *saxosa*
1′. Prophylls brown, firm, entire or irregularly broken or becoming fibrous with age and sometimes forming a reticulum above; outer perianth segments rarely less than 5 cm; in clumps (rarely solitary) southern Cape to eastern Transvaal.
   2. Prophylls occasionally forming a reticulum above, it not, leaves less than 1 cm wide or canaliculate; occurring in Natal, Orange Free State, Cape Province.
      3. Flowering in autumn in eastern Cape, southern Natal ..... d. subsp. *autumnalis*
      3′. Flowering in late winter, spring or summer in Cape Province, Orange Free State or Natal ..... a. subsp. *spathulata*
   2′. Prophylls not forming fibrous network above; leaf flat or curved (rarely canaliculate); occurring in eastern Transvaal, Swaziland, often associated with forest margin ..... b. subsp. *transvaalensis*

25a. subsp. **spathulata**—Fig. 3B.

Moraea spathulata (L. f.) Klatt, Dur. & Schinz., Consp. Fl. Afr. 5: 152. 1895.
Iris spathulata L. f., Suppl. 99. 1781. Type: Wolwekraal, Langkloof near Keurbooms River, *Thunberg* in Herb. Thunb. *1172* (UPS, holotype).
Iris spathacea Thunb., Diss. Iride no. 23. 1872. Type: Wolwekraal, Langkloof, *Thunberg* in Herb. Thunb. *1172* (UPS, holotype).
Moraea spathacea (Thunb.) Ker., Bot. Mag. *Tab 1103.* 1808, *non* Thunb. (1787).
Moraea longispatha Klatt, Linnaea 34: 560 (1866). Type: Banks of Kei River, "Tambukiland," *Ecklon & Zeyher* (Irid. 3) (MO, isotype).

Plants in large clumps, rarely solitary. *Prophylls* dark brown, brittle, becoming fibrous, extending above ground as a dark colored network. *Leaf* flat to

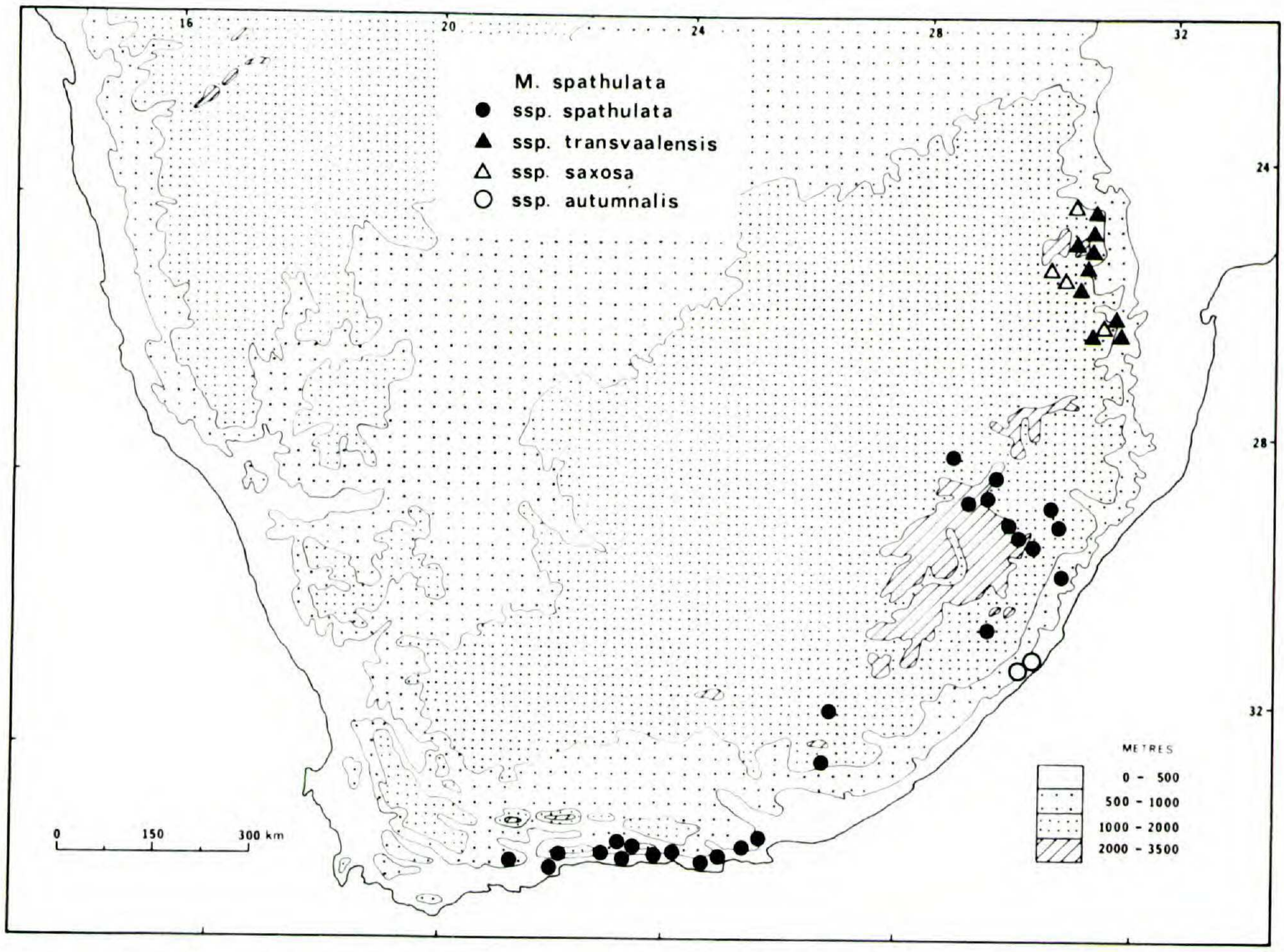

FIGURE 15. Distribution of *Moraea spathulata* and its subspecies.

canaliculate, 1–2.5 cm wide, green to glaucous. *Scape* simple or occasionally 1–2 branched. *Flowers* pale to deep yellow with darker nectar guides; *outer perianth segments* to 7 cm long; *inner segments* to 5.5 cm long. *Filaments* about 1 cm long, free in upper half; *anthers* about 1 cm long. *Style* about 5 mm with branches reaching 1.5–2 cm long, crests to 1.5 cm long. *Ovary* about 2 cm long; *capsule* 4–4.5 cm. *Chromosome number* $2n = 12$, *Naude s. n.* (PRE 30038); *Goldblatt 26* (J).

Flowering time July to November.

Distribution: Southern and eastern Cape, Orange Free State and Natal (Fig. 15).

This, the most variable of the four subspecies of *Moraea spathulata*, is also the most widespread. It is found from the George area of the southern Cape, where it is winter or early spring flowering, to southern Zululand and the Drakensberg slopes. It generally flowers in late spring in the latter areas. Plants of subsp. *spathulata* from the southern Cape coastal areas have the broadest leaves and the most fibrous corm coverings. Those occurring at higher altitudes are generally smaller and have more slender leaves, while forms in central Natal and southern Zululand tend to be variable, some races only being characterised by a rather bare stem instead of being covered by overlapping bracts.

Subspecies *spathulata* may be found on further examination to consist of several distinct varieties or subspecies, especially among the more slender mountain forms in Natal. The author has, however, found it impossible to suc-

cessfully draw the line between different forms as the variation between and among populations seems too inconsistent. With more study, particularly of live populations, a better understanding of the subspecies should be achieved.

28.28 (Bethlehem): Kestell (-BA), *Strey 9073* (NH); near Sentinel Gate (-DD), *Killick & Marais 2207* (PRE).

28.29 (Harrismith): Rensburgskop (-AD), *Jacobsz 292* (PRE); Bergville district (-C), *Killick & Marais 2139* (PRE).

28.31 (Nkandla): Near Eshowe (-CD), *Lawn 1116* (NH); *Gerstner 2423* (NH).

29.29 (Underberg): De Hoek, Estcourt District (-B), *Quail s. n.* (NH 5341); Tabamhlope (-BA), *Wood 10641* (NH); Nottingham Road (-BD), *Wood 5182* (NH, PRE).

29.30 (Pietermaritzburg): Howick (-AC), *Thomas s. n.* (NBG 58663); Greytown (-BA), *Wylie s. n.* (NH 21676); near Bothas Hill (-DC), *Wood 8650* (NH).

30.29 (Kokstad): Kotstad, hill tops, *Mogg 1795* (PRE); near Kokstad (-CB) *Haygarth s. n.* (NH 4183).

31.26 (Queenstown): Queenstown district (-D) *Galpin 1576* (GRA). Buffelsfontein, Halseton, *Stretton s. n.* (NBG 2902).

32.26 (Fort Beaufort): Katberg (-DA), *Dyer 789* (GRA).

33.21 (Ladismith): Garcia's Pass (-CC), *Leipoldt s. n.* (BOL 16057).

33.22 (Outdtshoorn): George (-CD), *Young s. n.* (BOL 5544), 38 km E of George (-DD), *Baker s. n.* (PRE); near Barrington, *Salter 6920* (BOL).

33.23 (Willowmore): Avontuur (-CA), *Fries, Norlindh & Weimarck 1533* (LD, PRE, SAM); Misgund-Avontuur (-CB), *Fourcade 434A* (BOL); S of Avontuur (-CC), *Mauve 4605* (PRE); Deepwalls Forest, *Horn s. n.* (PRE); near Keurboomsrivier (-DC), *Thompson 876* (PRE); *Loubser 875* (NBG).

33.24 (Steytlerville): Oudebosch (-CC), *Fourcade 868* (GRA).

33.25 (Port Elizabeth): Greenbushes (-CD), *Long 639* (PRE); Uitenhage, *Batten 1* (NBG).

34.22 (Mossel Bay): Pacaltsdorp (-AB), *Thorne s. n.* (SAM 51706).

34.24 (Humansdorp): Clarkson (-AB), *Cassidy 235* (NBG); Humansdorp (-B), *Rogers 2884* (PRE).

25b. subsp. **transvaalensis** Goldbl., subsp. nov. Type: Near Sabie Transvaal, *Goldblatt 610* (BOL, holotype, MO, isotype).—Fig. 2B.

Planta caespitosa (raro solitaria). *Prophylla* brunnea, saepe argenteo et purpureo colore striata ad basem, fragilia, integra aut irregulariter fracta, raro fibrosa supra. *Folia* 1–2.5 cm lata, plana aut parum concava. *Scapus* simplex. *Flores* pallidi lutei; *perianthii segmenta exteriora* 6–7.5 cm longa; *segmenta interiora* ad 6 cm longa. *Filamenta* circa 1.5 cm longa, *antherae* 1.2–1.4 cm, nigrae. *Stylus* ad 7 mm longus, rami ad 2 cm longi, cristae ad 1.5 cm longae. *Germen* circa 2–2.5 cm longum; *capsula* ad 4 cm longa.

Plants growing in large clumps. *Prophylls* brown, brittle, entire or irregularly broken, occasionally fibrous above. *Leaves* 1–2.5 cm wide,flat or slightly concave. *Scape* simple. *Flowers* very pale yellow; *outer perianth segments* 6–7.5 cm long, occasionally shorter; *inner segments* up to 6 cm long. *Filaments* about 1.5 cm long; *anthers* 1.2–1.4 cm long, black. *Style* about 7 mm long, branches to 2 cm long and crests about 1.5 cm long. *Ovary* 2–2.5 cm long; *capsule* 4 cm long. *Chromosome number* $2n = 12$, *Goldblatt 14* (J).

Flowering time: Late summer to autumn (December to March).

Distribution: Eastern Transvaal and Swaziland mountains (Fig. 15).

Subspecies *transvaalensis* is a distinct segregate of the *Moraea spathulata* complex occurring in the eastern Transvaal and Swaziland mountain regions. It grows in large clumps, usually on the verge of forests or thick bush.

24.30 (Pilgrim's Rest): Mariepskop (-DD), *van der Schyff 4553* (PRE); Mac Mac Falls area (-DD), *Goldblatt s. n.* (PRE 31508).

25.30 (Lydenburg): 8 km E of Lydenburg (-BA), *Obermeyer s. n.* (PRE 36286); Sabie valley (-BB), *Galpin 13587* (PRE); near Sabie, *Codd 9487* (PRE); *Goldblatt 610* (BOL, MO); Rosehaugh (-BD), *Mogg 13676* (PRE); Kaapsche Hoop (-DA), *Rogers 21048* (NH).

26.30 (Carolina): Little Usutu valley (-BD), *Compton 25400* (NBG, PRE).

26.31 (Mbabane): Gobolo, Mbabane (-A), *Compton 30349* (NBG); Komati Pass, *Compton 29643* (NBG); near Mbabane (-AC), *Compton 25066* (PRE).

25c. subsp. **saxosa** Goldbl., subsp. nov. Type: Summit of Long Tom Pass, *Goldblatt 612* (BOL, holotype, PRE, isotype).

Planta caespitosa aut solitaria inter saxa et in rimis. *Prophylla* pallida, submembranacea, integra aut ad apicem lacerata, sed non fibrosa. *Folia* atroviridia, plana aut parum concava, 0.6–1.5 cm lata. *Scapus* simplex. *Flores* lutei; *perianthii segmenta exteriora* 3.5–4.5 (–5.0) cm longa; *segmenta interiora* ad 3.5 cm longa. *Filamenta* ad 1 cm longa; *antherae* 7–9 mm longae. *Stylus* circa 6 mm longus, rami ad 1 cm longi, cristae ad 8 mm longae. *Germen* 2–3 cm longum, *capsula* 5 cm longa.

Plants growing in small clumps or solitary in rock crevices or among boulders. *Prophylls* pale, submembranous and entire or frayed at apex, but not fibrous. *Leaves* dark green, flat or slightly concave, 0.6–1.5 cm wide. *Scape* simple. *Flowers* bright yellow with a deeper yellow nectar guide; *outer perianth segments* 3.5–4.5(–5.0) cm long; *inner segments* up to 3.5 cm long. *Filaments* about 1 cm long, *anthers* 7–9 mm long. *Style* about 6 mm long, branches to 1 cm and crests about 8 mm long. *Ovary* 2–3 cm long; *capsule* 5 cm long.

Flowering time: December to February.

Distribution: Exposed rocky hilltops in the eastern Transvaal Drakensberg (Fig. 15).

This subspecies is smaller in all its characters than other forms or subspecies of *Moraea spathulata*, with the exception of the size of the capsule which is the largest in the *spathulata* complex. As mentioned, subsp. *saxosa* occurs on exposed rocky hills at various altitudes on the eastern Transvaal Drakensberg escarpment. Unlike most of the other subspecies of *M. spathulata*, the plants can be quite solitary, though they can also form large clumps. It is believed that growing among rocks and in crevices it cannot always achieve the caespitose habit, although it still maintains the potential to do so.

Apart from the reduced size of flower, leaf, and corms, it can be distinguished by its peculiar prophylls which are usually pale, short and soft-textured, similar to those found in *Moraea graminicola*, the latter also a representative of the large flowered *Grandiflora* group.

24.30 (Pilgrim's Rest): Mariepskop (-DB), *Strey 7914* (NH, PRE); *Hilliard & Burtt 5982* (NU); *van Dam s. n.* (PRE 26356); Goedgeloof near Belvedere, *Davidson 527* (J).

25.30 (Lydenburg): Dullstroom, Steenkamps Mountain (-AC), *Galpin 13184* (BOL, PRE); Kemps Heights (-AD), *Codd 8305* (PRE); 16 km E of Sabie (-BA), *Reynolds 2669* (PRE); Long Tom Pass (-BA), *Goldblatt 612* (BOL).

26.31 (Mbabane): Fonteyn, Mbabane (-A), *Compton 31117* (NBG).

25d. subsp. **autumnalis** Goldbl., subsp. nov. Type: Nyameni mouth, Port Edward district, *Strey 8619* (PRE, holotype, NH, isotype).

Prophylla atrobrunnea, fibrascentia aetati, interna pars saepe fibrior in summo. *Folium* ad 1 cm latum, canaliculatum, costatum, prominente in siccis exemplaribus. *Flores* lutei, purpureis venis.

Prophylls dark brown, but white streaked with purple below, becoming fibrous with age; inner sometimes fibrous above. *Leaf* usually less than 1 cm wide, canaliculate, conspicuously ribbed when dry (not seen fresh). *Flowers* yellow, veined with purple.

Flowering time: March to May.

Distribution: Eastern Cape, Transkei, Pondoland (Fig. 15).

As can be seen from the small number of specimens examined, subsp. *autumnalis* is poorly known. The plants resemble other forms of *Moraea spathulata* but have a comparatively narrow, canaliculate leaf; and this, together with its large flower and late flowering habit, suggest that they merit subspecific rank. Like other segregates of *M. spathulata*, the plants are usually found growing in clumps. Subspecies *autumnalis* can be distinguished from the other subspecies of *M. spathulata* by its narrow, prominently ribbed leaf and fibrous corm tunics.

31.30 (Port Edward): Nyameni mouth, Transkei (-AA), *Strey 8619* (NH); S of Port Edward, *Bayliss 2212* (NBG).

26. **Moraea alticola** Goldbl., sp. nov. Type: Mont aux Sources, *Schweickerdt s. n.* (PRE 28588, holotype, NH, isotype).—Fig. 2E.

Planta grandis, ad 1 m alta, caespitosa. *Cormus* ad 2 cm diam., densiter munitus fibris crassis brunneis. *Prophylla* brunnea fracta irregulariter sed facientia pallida, reticulata supra. *Folium* solitarium, excedens scapum, planum, 1.5–3 cm latum marginibus saepe prominentibus. *Scapus* erectus, simplex aut pauciramosus. *Folia* vaginantia 3–5, imbricata, ad 18 cm longa, viridia, apicibus brunneis. *Inflorescentia* pluriflora, spatha interior ad 15 cm longa, exterior aequalis aut brevior. *Flores* lutescentes, *perianthii segmenta exteriora* ad 8 cm longa, limbus ad 5 cm longus, 3–4 cm latus; *segmenta interiora* ad 7 cm longa, erecta. *Filamenta* ad 2 cm longa, connata usque dimidiam partem; *antherae* ad 1.5 cm longae. *Stylus circa* 1.3 cm longus, rami ad 2 cm longi, cristae circa 1.5 cm longae. *Germen* 2–3 cm longum, capsula ad 4.5 cm longa.

Plants large, to 1 m high, in large clumps. *Corm* about 2 cm in diameter, corms and base of stems covered by dark matted fibres of previous season's decayed leaves. *Prophylls* brown, broken irregularly but forming a pale, well developed fibrous network above the ground, sheathing the lower part of the leaf. *Basal leaf* exceeding the inflorescence, broad and flat, 1.5–3 cm wide, margin often thickened and yellow. *Scape* erect, simple or few branched. *Bract leaves* 3–5, overlapping, to 18 cm long, apices brown. *Inflorescence* several flowered, inner spathe 12–15 cm long, outer equal or somewhat shorter. *Flower* pale yellow with darker yellow nectar guide; *outer perianth segments* to 8 cm long, limb to 5 cm long and 3–4 cm wide; *inner segments* to 7 cm long, erect, to 2.5 cm wide. *Filaments* to 2 cm long, joined in lower part, *anthers* about 1.5 cm long, not reaching stigma. *Style* about 1.3 cm long, branches to 2 cm, crests about 1.5 cm long. *Ovary* 2–3 cm long; capsule about 4.5 cm long. *Chromosome number* $2n = 12$, *Trauseld s. n.* (BOL).

Flowering time: Summer, but occasionally from October to March

Distribution: Uppermost slopes and plateau of the Drakensberg in Natal, Cape and Lesotho (Fig. 16).

Moraea alticola, undoubtedly closely allied to *M. spathulata*, has been accorded specific rank, due in part to several distinct and easily recognisable features and to its spatial and ecological isolation from the various forms of *M. spathulata*.

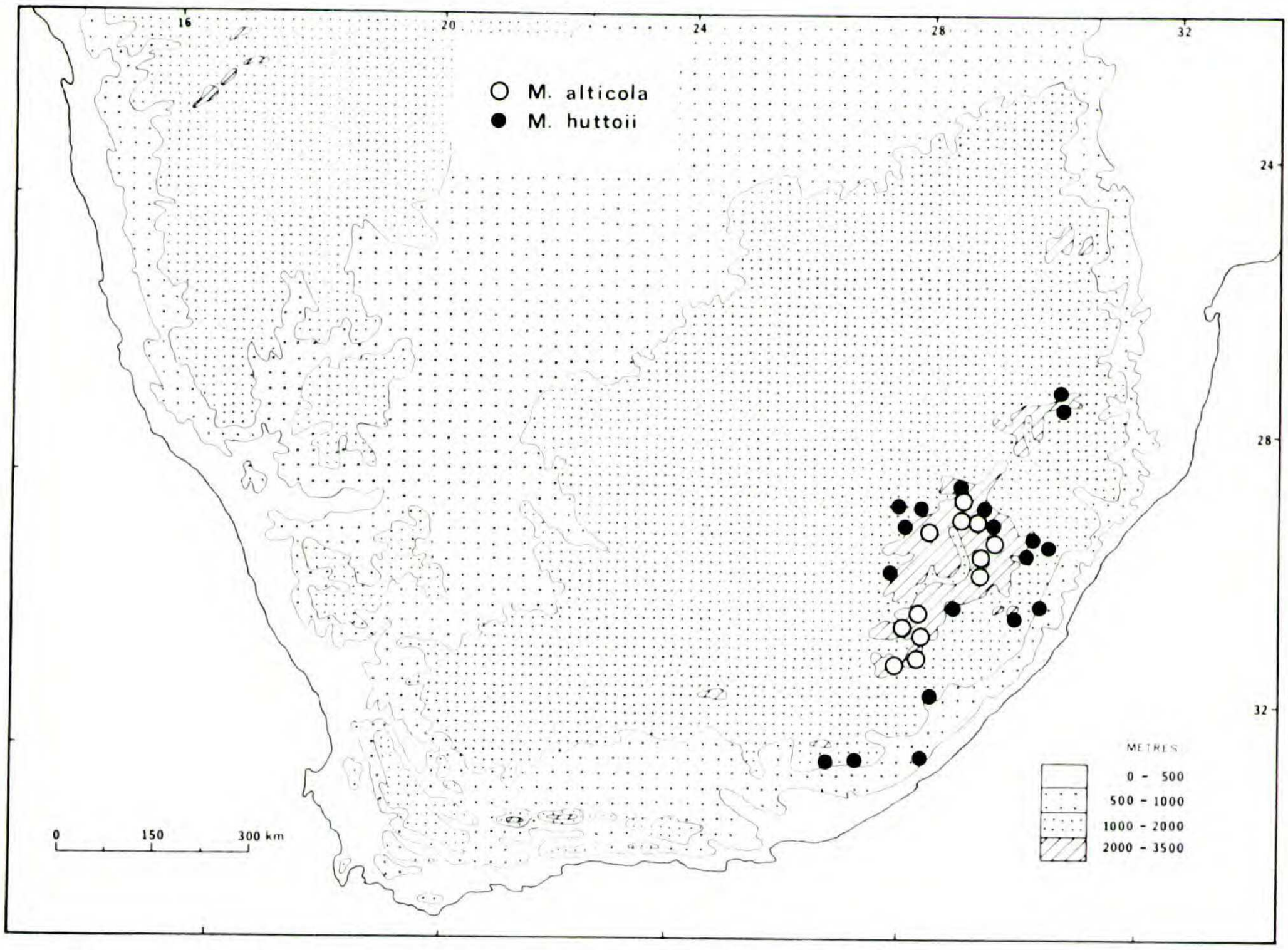

FIGURE 16. Distribution of *Moraea alticola* and *M. huttonii*.

In spite of its occurring in an alpine area, on the summit plateau of the Drakensberg, it is easily the largest, most robust species in the genus. While size alone makes *M. alticola* easy to distinguish, it can also be very readily recognised by its inner prophyll, which forms a well developed, pale network above the ground (Fig. 2E). Such a feature is found in other allies of *M. spathulata* but never achieves the same degree of development and is often absent in some individuals while present in others in the same population.

28.28 (Bethlehem): Moolman's Hoek Peak, *Galpin s. n.* (BOL 30818); Mont aux Sources (-DD), *Schweickerdt s. n.* (NH 26960, PRE 28588); Royal Natal National Park, *Oliver* 332 (NH); Mont aux Sources, *Schelpe 1409* (NU); Beacon Buttress, *Galpin 10150* (PRE).

28.29 (Harrismith): Cathedral Peak area (-CC), *Schelpe 470* (NU); Cathedral Peak escarpment, *Schelpe 487* (NU); Indumeni Dome, *Killick 1851* (PRE); Cleft Peak area, *Killick & Marais 2186* (BOL, PRE).

28.28 (Marakabei): Mosalamane Pass (-AA), *Jacot-Guillarmod 505* (ROML).

29.29 (Underberg): Giants Castle (-AD), *Bruyns-Haylett 27* (NU), Giants Castle, Gable area, *Trauseld 856* (NU, PRE); Bushman's Pass (-CC), *West 1710* (NH).

30.27 (Lady Grey): Majuba Nek, Sterkspruit (-DB), *Hepburn 289* (GRA).

30.28 (Matatiele): Satsannas Berg (-AC), *Galpin 6845* (PRE); Naudes Nek Pass (-CA), *Story 480* (PRE); Luhana Pass, *Galpin 2322* (BOL, PRE); 8 km W of Naudes Nek (-CC), *Reynolds 3418* (PRE).

31.27 (Lady Frere): Summit, Barkly Pass (-BB), *Rattray s. n.* (PRE 7321).

27. **Moraea huttonii** (Bak.) Oberm., Fl. Pl. Africa *Tab. 1581.* 1970.—FIG. 3A.

Dietes huttonii Bak., Bot. Mag. *Tab. 6174.* 1875. Type: Eastern Cape, *Hutton s. n.* (K, holotype).

Moraea rivularis Schlechter, Bot. Jahrb. Syst. 40: 90. 1908. Type: Ifafa, *Rudatis 100* (B, holotype).
Moraea baurii Bak., Handbook Irid. 50. 1892. Type: Baziya, along streams, *Baur 247* (K, holotype).

Plants large, to 1 m in height, growing in clumps. *Corm* about 1.5–2 cm in diameter covered by entire, brown prophylls. *Prophylls* 2–3 per stem, brown, innermost being longest, to 20 cm, entire or irregularly broken, rarely fibrous and forming a poorly developed reticulum at apex. *Basal leaf* linear, usually longer than the scape, 0.5–2.5 cm wide, flat or margins inrolled to some extent, rarely sub-terete. *Scape* erect, simple or bearing a few erect branches. *Bract leaves* 5–6 sheathing the stem, often overlapping, herbaceous with dry apex. *Inflorescence* several-flowered, inner spathe 8–14 cm, outer 2–3 cm shorter, apices dry. *Flowers* scented, yellow, with a large, deeper yellow nectar guide and a dark, brown to purple crescent on each style crest; *outer perianth segments* oblanceolate, to 5.5 cm long, limb to 3.5 cm long and 2 cm wide; *inner perianth segments* lanceolate to 4.5 cm long. *Filaments* to 1.3 cm long, joined in lower part; *anthers* 7–9 mm long. *Style* about 8 mm, branches about 1.5 cm long, to 8 mm broad, crests 1–1.3 cm long. *Ovary* about 1.5 cm long, clavate; *capsule* about 3 cm long. *Seeds* depressed, triangular. *Chromosome number* $2n = 12$, *Mauve s. n.* (PRE) (Fig. 3A).

Flowering time: Spring to early summer.

Distribution: Along watercourses, widespread in the eastern Cape, Lesotho, Natal and extreme south eastern Transvaal (Fig. 16).

Icones: Baker, Bot. Mag. *Tab. 6174.* 1875; Batten & Bokelmann, Wild Flowers of the Eastern Cape Province. *Pl. 34, fig. 5.* 1966; Obermeyer, Fl. Pl. Africa 40: *Tab. 1581.* 1970.

Moraea huttonii is, like most aquatic or semi-aquatic plants, very widespread. It can easily be identified by its habitat and by the conspicuous violet to brown marks on the style crests. In spite of its wide distribution and frequency, it remained poorly understood for many years. It was originally described by Baker as a species of *Dietes*, the cormous nature of the rootstock being misunderstood. In later works, Baker (1892, 1896) ignored the species altogether and included specimens of *M. huttonii* under *M. spathulata* (as *spathacea*) and *M. baurii*. N. E. Brown (1929) also included *M. huttonii* under *M. spathulata*. In 1969 Mrs. A. A. Mauve of the Botanical Research Institute revived Baker's species, transferring it, correctly, to *Moraea*.

Moraea rivularis Schl. must be included in *M. huttonii*, as there is no doubt it is the same species. *Moraea baurii* presents more of a problem. The type specimens are incomplete, lacking leaves or corms, and the flowers do not show the very typical violet mark on the style crests. The determination is based mainly on Baur's ecological note that the plants grow along streams. *Moraea baurii* is, therefore, only tentatively included as a synonym of *M. huttonii*.

27.30 (Vryheid): Oshoek, Wakkerstroom (-AC), *Mauve 4485* (PRE); *Devenish 89* (PRE); Donkerhoek, Utrecht district (-AD), *Devenish 1416* (PRE).
28.27 (Senekal): Ficksburg (-DD), *Fawkes 219* (NBG).
28.28 (Bethlehem): Leribe (-CC), *Dieterlen 354* (NH, PRE); *Dieterlen 7049* (GRA, SAM); Mont aux Sources (-DB), *Hutchinson, Forbes & Verdoorn 2* (NH, PRE); *Trauseld 264* (PRE); *Sidey 1995* (PRE).

28.29 (Harrismith): Near Cathedral Peak Hotel (-CC), *Schelpe 892* (NH, NU); Cathedral Peak area, *Dohse 132* (NH, PRE).
29.27 (Maseru): Mapotong (-BB), *Schmitz 1265* (ROML); Putsua mountains, Mafeteng district (-D), *Esterhuysen 13171* (BOL); Makhaleng (-DB), *Compton 21040* (NBG).
29.29 (Underberg): Giants Castle (-AB), *Skead 178* (NU); Giants Castle, Mumden stream, *Trauseld 998* (PRE); The Hook, Mooi River (-BD), *Bourquin 312* (NU); Ross, Umgeni Poort, *Moll 2666* (PRE); Fort Nottingham, *Mauve s. n.* (PRE 30478), *2426A* (PRE); Nottingham/Bulwer road (-DB), *Mauve 4472* (PRE).
29.30 (Pietermaritzburg): Lions River (-AC), *Moll 1180* (NU, PRE).
30.28 (Matatiele): Between Maclear and Naude's Nek (-C), *Werdermann & Oberdieck 1132* (PRE).
30.29 (Kokstad): Mieliefontein (-BC), *Strey 9161* (NH, PRE).
30.30 (Port Shepstone): Dumisa (-AD), *Rudatis 691* (LD).
31.28 (Umtata): Baziya (-CB), *Baur 514* (BOL).
32.26 (Fort Beaufort): Hogsback (-DB), *Bokelmann 5* (NBG).
32.27 (Stutterheim): Boma Pass, Keiskammahoek (-CA), *Acocks 9101* (PRE).
32.28 (Butterworth): Kentani (-CB), *Pegler 1206* (BOL).

EXCLUDED TAXA

1. **Moraea balenii** Stent, Fl. Pl. Africa *Tab. 301.* 1928.

The species figured with the type description is a small plant (stem 23 cm high) with a long conduplicate leaf and prophylls which break up into rigid bristles. It was described from a specimen cultivated at the National Herbarium, Pretoria, which flowered in June and was reported to have been found at high altitudes near Katberg, flowering in March.

A search for a plant matching this description at Katberg proved fruitless, but another very large conspicuous species of yellow flowered *Moraea* was found in this area (*M. reticulata*). This species has a stem 40–60 cm long, a canaliculate leaf, and characteristic prophylls and corm tunics which are fibrous, with the inner prophyll extending well above the ground as a reticulate sheath.

Moraea balenii itself bears no close resemblance to this *Moraea* and is actually very similar to a second species, *M. galpinii* which has a short stem, bristle-like prophylls and a leaf with inrolled margins. *Moraea galpinii* flowers in August and September in the wild. It seems possible that *M. galpinii* and a *Moraea* from Katberg became confused in cultivation. In view the of possibility of an error, *M. balenii* has been excluded and unless a plant matching the description can be found at the type locality, this species will remain one of doubtful validity.

2. **Moraea spathulata** var. **natalensis** Baker, Fl. Cap. 6: 14. 1896.

The specimens cited under this variety belong to several species including *Moraea ardesiaca*, *M. moggii*, *M. spathulata* subsp. *spathulata*. The diagnosis is too brief to make it possible to decide on which of the specimens it was based.

3. **Moraea trita** var. **foliata** N. E. Br., Trans Roy. Soc. S. Africa 17: 347. 1929.

The type of this taxon, which is at Kew Herbarium, is a Wilms collection (number *1418*) from Devils Knuckles and dated February 1888. The specimen is identical to the type of *Moraea trita* (= *M. stricta*), also at Kew (*Wilms 1419*, Lydenburg, September 1895).

Wilms material examined at Paris indicates a possible error. A specimen, *Wilms 1418*, also labelled Devils Knuckles, February 1888, is not the same as the Kew specimen with the same date and number. The Paris specimen is *Moraea elliottii*, a species flowering in summer and common in February in the area. *Moraea stricta*, typically leafless when flowering or with a dead, terete leaf adhering to the scape, flowers in spring. It seems that the Kew specimen named *M. trita* var. *foliata* is simply a collection of *M. stricta* with old, dead leaves adhering to the stem and that the herbarium ticket may have been placed with the wrong collection.

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